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VOL LX 12 MARCH 1949 No 1548

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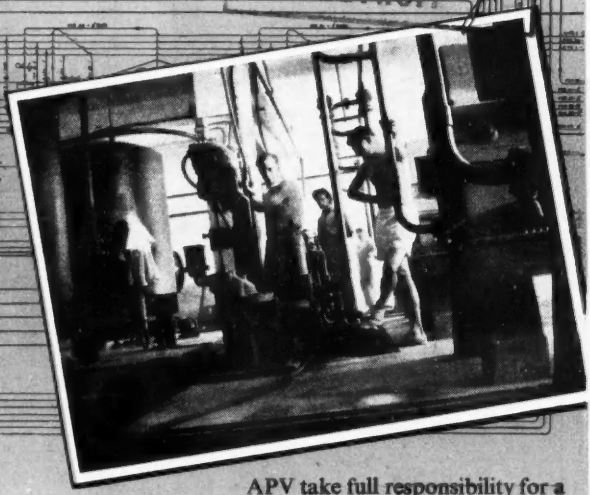

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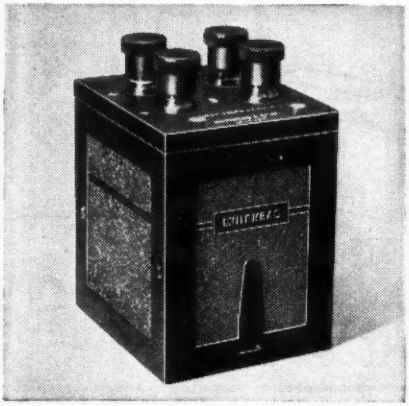

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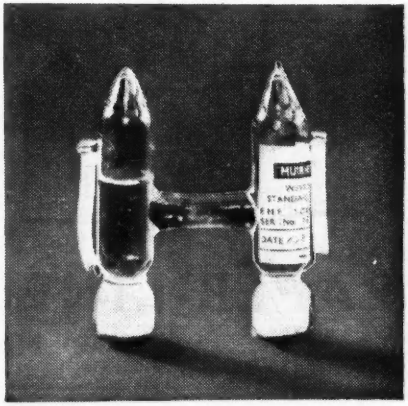

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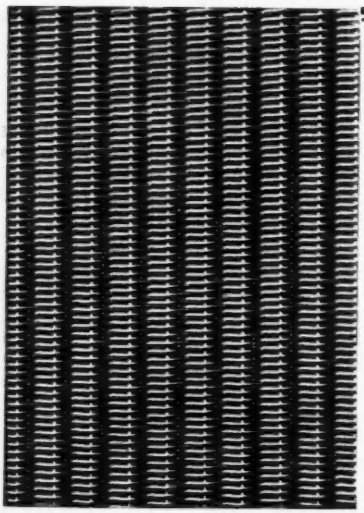

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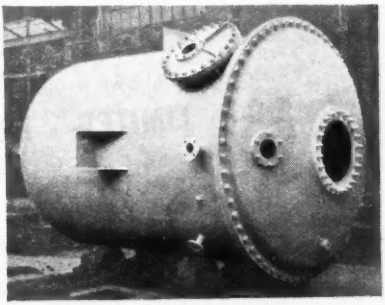

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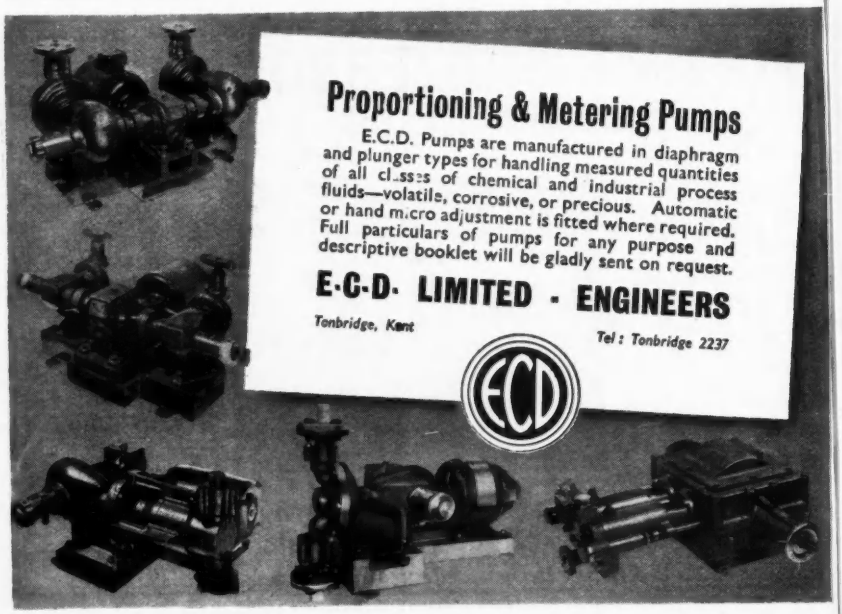

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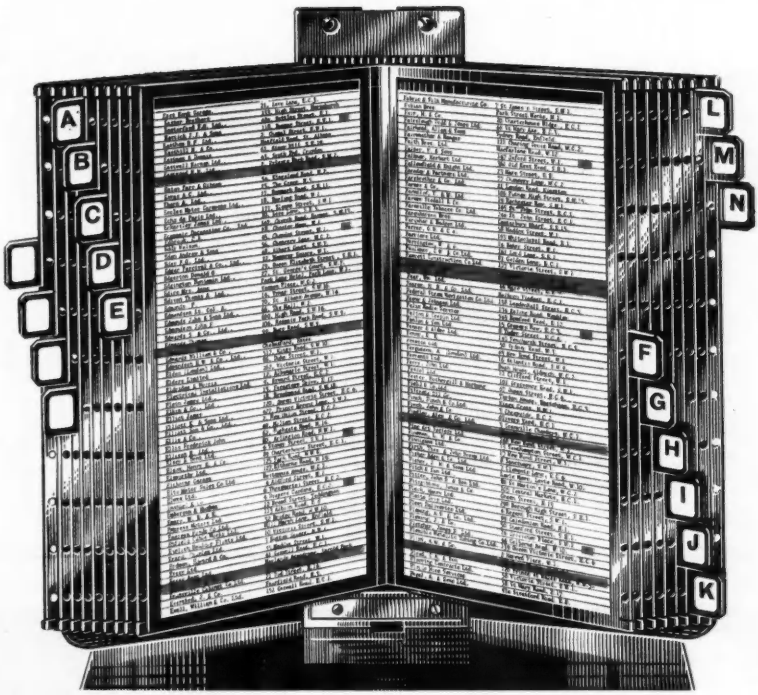

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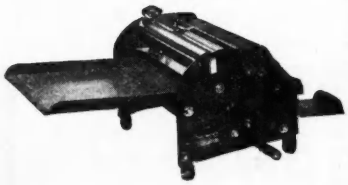

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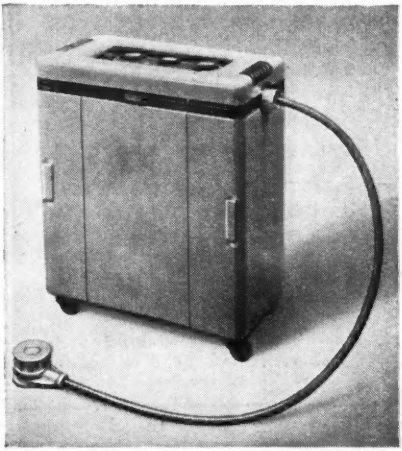

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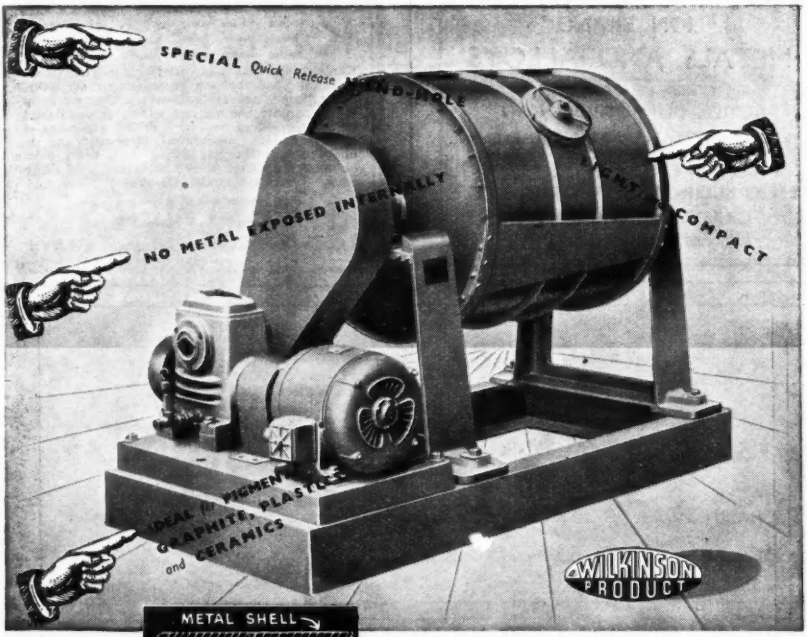

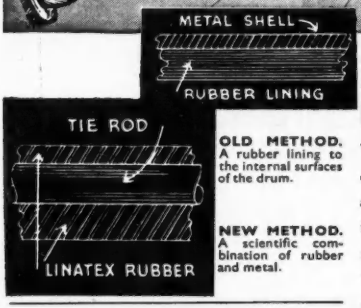
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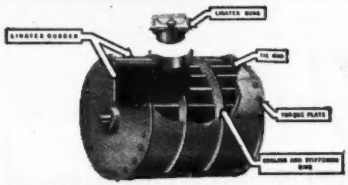

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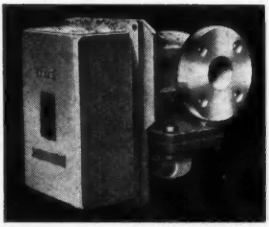

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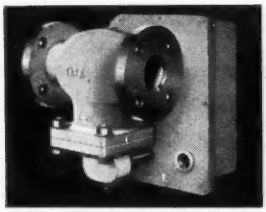

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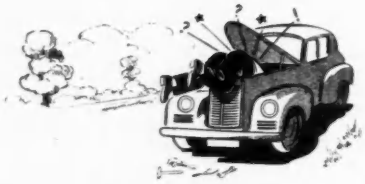

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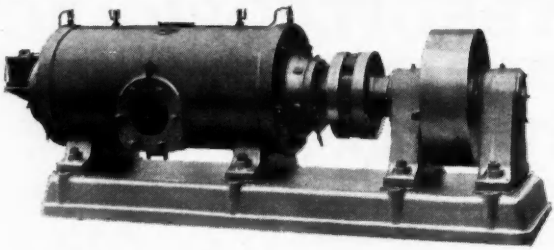

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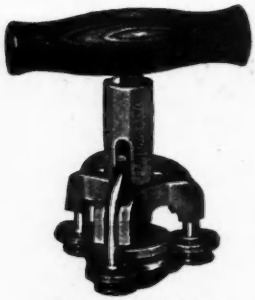

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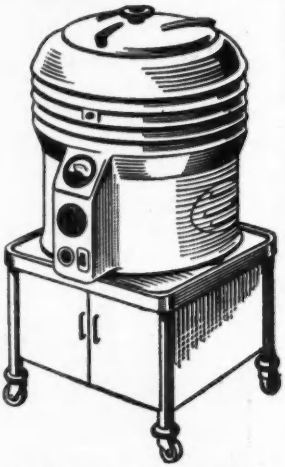

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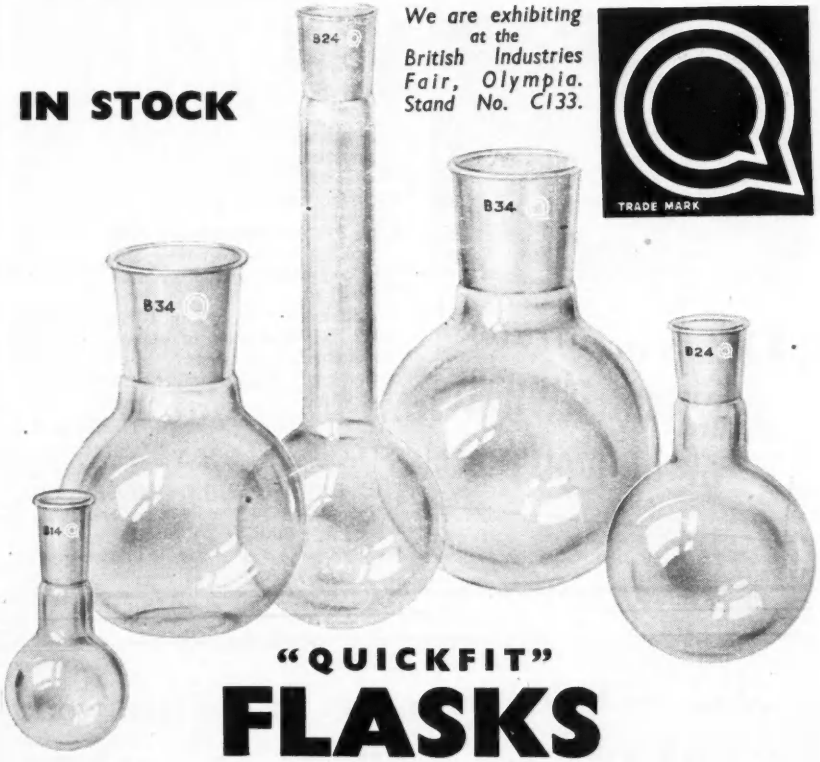

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Russian Literature Neglected

IN the swelling torrent of world scientific literature, it is noteworthy that the tributaries emanating from the U.S.S.R. are also increasing in volume and importance. That may not represent the view generally held of the effect of Soviet policy in scientific affairs, but there is evidence that, in volume at least, Russian scientific publication is far more ample now that it has ever been. While their general periodicals are published in all the languages of the 180 peoples who inhabit those vast territories, only four languages are used in their *main* science journals, namely, Russian, English, French and German. The Russian language is naturally the most common medium.

Many pointers indicate the increasing importance of study of the Russian language. Larger firms are now carrying out regular abstracting of the main journals; the requirement that applicants for library-intelligence types of posts shall have a knowledge of this language appears more and more frequently in advertisements. Summaries of papers from Russian sources are frequently included in the abstracts of contemporary periodicals and, during 1946 and 1947, the American *Journal of Chemical Education* ran a series of articles on " Chemical Russian, Self-Taught," on " Searching the Russian Technical Literature " and on " Russian in the Chemist's Curriculum." These were connected with a paper presented by James W. Perry before the Division of Chemical Education at the 109th meeting of the American Chemical Society in 1946.

Notably in the field of work with gases—separation, low-temperature work, applications of oxygen—do Russian achievements deserve special attention. But, more generally: " There is a store of chemical information ranking in importance and reliability contained in . . . Russian scientific literature," writes J. G. Tolpin in one of the papers mentioned above. He decries the view that co-operation and exchanges of periodicals can no longer be sought and makes a most important survey of publications, character of work, numbers of chemists and of institutes (*Journal of Chemical Education*, 1946, p. 123).

As science develops, it seems to show more clearly an underlying unity even while its complexity increases. One aspect of the complexity is the need for at least some chemists to devote themselves to mastery of Russian, notwithstanding its apparently strange script and its highly inflected grammar. The Cyrillic script—to the uninformed a terrible obstacle—is in fact sufficiently tractable to permit the average student to read slowly in perhaps his fifth hour of instruction. Command of the grammar, a more serious problem, however, presents no greater difficulty than that of any other inflected language.

There are three grammatical genders and, as in German, they do not always

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conform with the "natural" gender. Nouns and adjectives are both declined and must agree in number, gender and case.

To compensate for the difficulties, there are two helpful features for British chemists. Word order is very similar to that of English and is just as happy, carefree and flexible. Furthermore, the actual vocabularly of chemical terms consists very largely of transliterations from the English (or German).

Formulæ in papers and books are given in our own familiar Latin script. Mathematical equations show the normal jumble of Latin and Greek characters with which we are well accustomed. It will be seen that the path of the English chemist translator in dealing with Russian-into-English, which will be the common case, is somewhat easier than may at first have been feared.

What, then, is the position on availability of this literature? Paper supplies seem to be as short in the U.S.S.R. as here—and circulations at tightly pegged as ours were until recently. Thus, the main English distributors inform us that a quota of each journal is allotted for export and that orders are accepted up to the limit of this quota. Further orders are necessarily refused. It is this situation which may give rise to the stories about reluctance to export due to political censorship, stories which are not invariably confirmed upon closer inquiry.

A catalogue of journals entitled "Periodica U.S.S.R., 1949," issued by *Mezhdunarodnaya Kniga*, Kuznetski Most, 18, Moscow, lists 207 periodicals—an increase on last year. Of these 31 are in the field of natural science (six devoted exclusively to chemistry) and 30 in the field of "Technics." A number of these are chemical trades and technological journals of applied chemical interest. They include such titles as *Sugar Industry* and *Refrigeration Technics*. Of the pure chemical journals, at present only the *Colloids Journal* is booked up; the others have copies available.

Stripped of prejudice, these are the facts.

General and commercial adult education institutes in London and other large centres of population give facilities for study of Russian. A range of grammar books and readers is available in Britain, both of the type requiring the aid of a teacher and of the self-educator type. The scientific libraries and the larger municipal and technical ones stock copies of the journals. Are British chemists then going to make the effort to learn this new language, and so gain a critical insight into Russian progress—or retire behind a self-imposed philological curtain?

NOTES AND COMMENTS

Harwell's First Plutonium

AN event possibly historic in its implications was recorded this week in the announcement by the Ministry of Supply that plutonium, the highly fissile element produced in quantity only in the U.S.A., had been produced at the Atomic Energy Research Establishment, Harwell, Berks. Because of the low power at which the "Gleep"—the graphite low-energy experimental pile—operates, the quantity of plutonium extracted from a uranium slug was small. The amount, however, was sufficient for investigation of the chemical and engineering problems likely to be met in large-scale production at the atomic station now under construction at Sellafield, Cumberland. Some of the difficulty of the extraction task is evidenced by the knowledge that these slugs contain many radioactive elements besides the one sought and can be safely processed only after a specified lapse of time and employing elaborate precautions. The present reward of so much effort is in the form of a solution of plutonium salt and—perhaps more important than this—a valuable addition to British technology. The other highly significant implication is the fact that the newly-created plutonium can play the part of its own progenitor—U235—in effecting still further conversions of non-fissile uranium.

"Rate for the Job"

THE existence of wide discrepancies between the emolument of senior scientific workers doing work of equal importance has been the normal condition for so long that it became almost too familiar to be worth comment. That, of course, did not imply that highly experienced men fulfilling heavy responsibilities in research or teaching have been content in the knowledge that others no better qualified were receiving sometimes 50 per cent more remuneration in return for relatively simple services. But it was an established anomaly which no one seemed determined to challenge and devotion to the job—in the laboratory or the lecture hall—undoubtedly helped to reconcile the relatively underpaid with the sort of "injustice" which in most other spheres of work would have provoked strikes and demonstrations.

Setting the Pace

THAT tranquility under difficulties seems to have been dissipated for good—by Government intervention in implementing the National Health Insurance scheme and by the recommendations of the Spens Committee. Those proposals—as Sir John Anderson lately made clear to the Parliamentary and Scientific Committee—although they related to medical men in State employment, will set up fresh anomalies and inevitable unbalance in many other categories of specialist employment, including the scientific Civil Service. The rewards offered to academic workers are likely to be relatively even less attractive than they were in comparison in the past with some of the more responsible posts in industry. The disruptive effect of all this is obvious and has now been recognised by the appointment by the Parliamentary and Scientific Committee of a broadly based sub-committee to inquire into the whole subject of payment of scientific and medical teaching staff at the universities and the repercussions among corresponding workers in other spheres. No one will envy them their task or doubt its necessity. It is fortunately one of the most representative committees yet summoned, which, in view of the ubiquity of the problem now developing, is as it should be.

Low-Temperature Metals

EVIDENCE of significant progress has steadily been accumulating to encourage the hope of a new approach to the problem of embrittlement of metals at very low temperatures. The difficulty this presents has long been a familiar one in some departments of chemical industry and latterly the needs of the refrigeration industry, of high altitude aircraft and of workers in the Polar regions have brought to bear fresh investigations, from which at least one important new concept is emerging. Discussing these low-temperature materials at a joint meeting in London last week of the Institution of Chemical Engineering and the Low Temperature Group of the Physical Society, Mr. E. W.

Colbeck recalled that for metals there often exists a critical temperature at which there is a rapid onset of embrittlement, as determined by measurements of impact value. This "transition temperature" in austenitic steels corresponds with a degradation of the austenite to martensite, and results tend to indicate that metals with a face-centred cubic lattice are less liable to this embrittlement. Good impact values are, of course, not the only mechanical properties required. They do, however, indicate the main potential points of weakness. Non-ferrous metals—except solder—generally maintain good properties down to liquid hydrogen temperatures; their tensile properties are even improved. This conforms with the face-centred cubic lattice hypothesis and underlies the fact that copper and aluminium, although their strengths are much inferior to those of steel, have hitherto been used almost exclusively in the low temperature ranges. These new researches may alter that situation.

Better Pasteurisation ?

FOOD chemists and many others will watch with lively interest for scientific confirmation of some very remarkable claims which have lately been made in the U.S.A. Accepted at their face value, these would suggest that a radical change may be impending in the principles of milk pasteurisation, capable of conferring important benefits wherever better food conservation is as urgently important as it is here. First American reports indicate that the process elaborated by Dr. Roy Graves, formerly of the U.S. Department of Agriculture, and Mr. J. Stambaugh, a Valparaiso dairy farmer, differs markedly from established principles of milk pasteurisation, and the knowledge that the latter is far from being completely satisfactory in one or two important respects encourages hope that the American claims are well founded. They suggest that it would be possible to process milk so that it would retain its full flavour and could be canned and remain fresh at room temperature for three weeks. The importance of the last factor in spreading over seasonal abundance and reducing waste and handling charges is self-evident. Stambaugh and Graves are said already to be producing canned milk with a bacteria count of 500 (compared with the permitted maximum of 30,000 for Grade A milk in Chicago). Their process has borrowed some chemical engineering principles, especially in the maintenance of the milk in vacuum conditions throughout and meticulous temperature control. The temperature is suddenly raised in jacketed spiral coil pasteurisers, under vacuum and with turbulence, to 190°F., for approximately one second. Charging into sterilised cans is performed in a nitrogen atmosphere and the milk and container are again sterilised. These represent only a part of the process, which will in any case call for a great deal more testing, and for research on a scale at least as large as the canning of fruit juices and beer required. The possibilities, however, are too attractive to be dismissed without further investigation.

EDUCATING YOUNG WORKERS

A SECOND conference on the Education of the Young Worker, concerned with "The Entry into Work, Guidance and Initiation," is to be held at Manchester College, Oxford, from July 23-29, inclusive. Like its predecessors in 1948, it has been arranged under the auspices of the University Department of Education, whose director is Mr. M. L. Jacks, and aims at bringing together representatives from industry, education, central and local government departments, voluntary organisations and other bodies who are concerned in the education and welfare of people between the ages of 15 and 20 who are no longer in full-time attendance at any educational establishment.

CHEAPER LINSEED OIL

The Minister of Food announces that, following reductions in the costs of the raw materials, the prices of linseed and castor oils (naked ex works) during the four-week period April 2, will be as follow: Linseed oil from £185 per ton to £170 per ton; linseed oil foots from £135 per ton to £120 per ton; castor oil firsts from £170 per ton to £142 per ton; castor oil seconds from £166 per ton to £135 per ton. The very welcome relief was the subject of a question in the House of Commons last week (*page* 382).

The price of all other unrefined oils and fats and technical animal fats allocated to primary wholesalers and large trade users during this period will remain unchanged.

Aiding Cancer Research

Free Distribution of Radio Isotopes

BROADENING the base of its cancer research programme, the U.S. Atomic Energy Commission's Division of Biology and Medicine has announced that it will make available to qualified cancer research workers in the U.S.A. without charge all the radio isotopes now being sold. According to the earlier programme, three radio isotopes only—those of the elements iodine, phosphorus and sodium—were previously available free of production costs for use in cancer research.

Radium Substitute

The new policy will make freely available the radio isotopes of more than 50 additional elements. Notable among these is Cobalt-60, which gives promise of becoming an effective substitute for radium. Two other important cancer research materials that will now be available without charge are the radio isotopes of gold and carbon. The new programme has been made possible through the improvement of isotope production techniques at the Oak Ridge National Laboratory, Tennessee, and at the Argonne National Laboratory, Chicago, Illinois.

A sum of $450,000 has been set aside to defray the cost of the new programme during its first year of operation. The only charge to be made for radio isotopes will be a nominal $10 for handling and the actual cost of transportation. Where the isotopes are synthesised into a chemical compound, the user will be required to pay for the cost of synthesising the compound.

The free isotopes will be allocated for (1) cancer investigations involving animal subjects; (2) research programmes studying basic cellular metabolism of cancerous cells, and (3) experimental programmes designed to evaluate the therapeutic use of radioactive materials.

Wider Uses

The useful employment of these isotopes is not only in their function as tracers. Since the radiations they emit may be used to destroy living cells, scientists hope to develop means for concentrating them in cancerous tissue and thus selectively destroying it.

A radio isotope of the element iodine—Iodine-131—has been used to a limited extent in the diagnosis and treatment of certain types of thyroid cancer, and Phosphorus-32 in the treatment of certain types of the cancerous condition, leukemia. But, in general, effective radiotherapy for cancer must wait upon further developments in basic cancer research. This research the commission hopes to stimulate by the free distribution of radio isotopes.

New Petroleum Chemicals

Widened Range Available this Year

FURTHER information has now been given by Petrochemicals, Ltd., about the petroleum derived chemicals, the manufacture of which has started at the new plant at Partington, near Manchester.

The products, to be marketed under the trade name Catarex, now in production are: Benzene; toluene; xylene; aromatic solvents and plasticisers and pitch. By the Autumn it is anticipated that there will also be available in bulk: Isopropyl, alcohol and ether; ethylene, oxide and glycol; naphthalene; hydrocarbon resins; para tertiary butyl phenol.

Further units of the plant should be completed by the end of this year which will make possible the production of such chemicals as polycyclic aromatics, propylene derivatives, acetone and ethylene dichloride.

The plant has an initial capacity of approximately 75,000 tons a year of finished products, and a highly specialised technical service staff has been engaged.

FEBRUARY STEEL RECORD

ANOTHER record of production was established by the steel industry last month with an average weekly output of 211,100 tons, which represents an annual rate of 16.176 million tons. This is easily the highest production figure ever reported, exceeding by 416,000 tons the record set up in November, 1948.

Pig iron output for February was at the average weekly rate of 181,000 tons or 9.422 million tons annually, which was 160,000 tons more than the annual rate in January.

HEXANE FATALITY

THE circumstances of a fatal accident on Tuesday at the Rayners Lane, Pinner, premises of Baird & Tatlock, Ltd., scientific instrument manufacturers, were to be investigated at an inquest yesterday (Friday—after THE CHEMICAL AGE had gone to press).

The occurrence, which resulted in the death of a forewoman in the packaging department, is understood to have originated in the dropping of a bottle of leather-dressing fluid containing hexane, the vapour from which ignited when it came in contact with a gas fire. Such bottles are conspicuously labelled as inflammable and precautions had been taken to prevent them being in the proximity of naked flame.

Several women working in the packaging department received treatment for burns caused by the flash as the vapour ignited, and windows were blown out. The damage was confined substantially to one room and production of instruments is not affected.

Standardised Specifications for Plastics

BSI New and Revised Recommendations for Moulding Materials

REINFORCING the concerted movement to establish for U.K. plastics products and raw materials readily recognisable standards of quality (THE CHEMICAL AGE, *59*, p. 643), the British Standards Institution has just issued a new standard specification relating to polystyrene moulding materials and a revised edition of the existing standard for phenolic synthetic resin moulding materials.

The first, BS 1493 : 1948, for polystyrene moulding material, has been issued under the authority of the Plastics Industry Standards Committee and of the Chemical Divisional Council.

The standard covers both general purpose moulding material and material suitable for electrical use. The requirements for both types of material cover screen analysis, percentage of methanol soluble matter, percentage of volatile matter, viscosity in benzene solution, impact strength and softening point.

For material for electrical use, an additional requirement is that the power factor and permittivity of the material shall not exceed specified values when determined at a frequency of one megacycle per second by the Hartshorn and Ward method.

BS 1493 differs in several respects from its ASTM equivalent and particularly in the addition of a test for volatile matter. This is made necessary by the evidence that crazing in polystyrene mouldings may be controlled by a check on the amount of volatile matter present.

Another point of difference is that the British method of determining softening point uses a very small test specimen which would be easier to mould and likely to be more free from internal strain than the relatively large ASTM specimen.

The standard (2s., by post) includes all the usual series of detailed appendices describing the exact methods of test.

The revision of BS 771 (synthetic resin (phenolic) moulding materials) is noteworthy because of the wide use of phenolic moulding materials, and the fact that this standard is based on statistical principles. The BSI states that little confidence can be placed in the results of tests on a small number of specimens made from a batch of materials.

The standard therefore relies on continual control of the product during manufacture. It defines basic values for the properties of phenolic moulding materials, and specifies the evidence which will be accepted as indicating conformity with those values.

It specifies mandatory requirements for the following properties of eight types of moulding materials: tensile strength, impact strength, surface resistivity, volume resistivity, heat resistance, power factor and permittivity.

The standard (5s.) also specifies optional requirements, any of which may be invoked by a purchaser, for water absorption, plastic yield, electric strength, and acetone-soluble matter. It describes all the test procedures.

Wide Support for BSI Objectives

THE important part played by the British Standards Institution in the proper representation of all interests concerned in production and use of industrial standards was emphasised by Mr. Roger Duncalfe, chairman of the general council, when he welcomed Mr. Harold Wilson, President of the Board of Trade, and Mr. G. R. Strauss, Minister of Supply, at the institution's annual dinner in London.

Mr. Wilson, replying, said it was the desire of the Government to see the position of the British Standards Institution strengthened, and urged all sections of industry to give their closest consideration to the preparation of national standards. He referred to the utility scheme, which was in effect emergency standardisation, and which had proved of great value to the community. He invited manufacturers to co-operate with the BSI in the development of standards and in the use of certification marks to indicate conformity with a British Standard.

An extension of the work of the BSI was forecast by Mr. G. R. Strauss, Minister of Supply, proposing the toast of the institution. He had set up a committee which was meeting representatives of the national bodies and the various branches of the engineering industry and discussing standardisation problems with them.

Replying to the toast of the guests, Sir Frederick Bain, President of the Federation of British Industries, said that he and those associated with him in the development of large business undertakings were in agreement that standardisation work should be concentrated under one national body which had the confidence of both industry and the Government.

$100 Million Chemical Claim

Ownership of U.S. General Aniline

CONTENDING that it was justified in seizing the General Aniline and Film Corporation as enemy alien property during the war, the U.S. Department of Justice last week again claimed a $100 million interest in the corporation and filed a suit in the United States District Court, Washington, D.C., for a $9,498,220 tax claim against the Swiss firm, I.G. Chemie. The latter contends that it was and is the true owner of General Aniline.

The Justice Department alleges that I.G. Chemie, also known as Interhandel, of Basle, Switzerland, was "a cloak and dummy for I.G. Farben," the pre-war German chemical trust, and that the firm had "conspired with I.G. Farben and others to cloak the property of I. G. Farben throughout the world." The Government maintains the General Aniline stock was the property of I.G. Farben when the former was seized in 1942 by the American authorities.

The multi-million dollar General Aniline and Film Corporation is one of the leading chemicals, dyestuffs, and photographic supplies manufacturers in the U.S.A. The corporation's annual net earnings are between $3 million and $5 million and it has plants in Rensselaer and Birmingham, New York, Graselli, New Jersey, and in other cities. Among its products are Ansco film, cameras, dyestuffs, sensitised paper and a range of detergents and chemicals.

The current action is the outcome of a suit filed in the same court last October by I.G. Chemie, which sought the restoration of the property, claiming that it was neither an enemy nor the ally of an enemy of the U.S.A. Replying to I.G. Chemie's suit, the Justice Department is now seeking a court order to oblige I.G. Chemie to pay the U.S.A. the $9,498,000 claim which includes taxes, penalties and interest, and has cited a series of transactions dating back to 1929.

Alleged $32m. Profit

These transactions, the Government alleges, involved that transfer of patents and other property from I.G. Farben and I.G. Chemie to the Standard Oil Company of New Jersey in which the Swiss firm received $35,059,366 worth of stock in exchange for property which had cost $2,385,714. By this transaction the Swiss firm is alleged to have made a net profit of $32,673,652 on which no taxes were paid, nor were any taxes paid on dividends earned between 1930 and 1933.

When the U.S. Treasury Department took over control of General Aniline shortly after the attack on Pearl Harbour, it began to remove personnel close to I.G. Farben. In April, 1942, the Alien Property Custodian took over the stock and continued the weeding-out policy. Thereafter a new management was installed by the Government and a research division was created.

Previously, research and technology had been supplied by I.G. Farben. In 1941, under German control, $13 million had been spent on research, and in 1944, under United States control, $2,545,000.

As soon as the U.S.A. was at war General Aniline's large resources were turned to war production. Equipment was turned out for the U.S. Navy, instruments were made for the Air Force, and films for the Army. In addition, dyes were produced for uniforms, smoke colours were evolved for artillery and recognition use. Each of the company's plants received awards from the Army and Navy for efficiency in the war effort.

(*Continued at foot of next column*)

Titanium "Monopoly"

$43,000 Penalties

PLEADING *nolo contendere* to charges that they had conspired to restrain and monopolise world trade in titanium pigments, the National Lead Company, E. I. du Pont de Nemours & Co., Inc., and four other defendants last week were ordered to pay fines totalling $43,000 by the United States District Court in New York.

The alleged conspiracy was dissolved by a civil anti-trust suit which ended in March, 1945, when the New York court ordered the defendants to grant non-exclusive licences for the production of titanium pigments to all who wanted them on the payment of reasonable royalties.

Firms and Individuals

The U.S. Supreme Court upheld this decision on appeal in 1947. Defendants in the case and the fines ordered were: National Lead Company, $10,000; Titan Company, Inc., a holding company largely owned by National Lead, $10,000; Fletcher W. Rockwell, former National Lead president and former director of Titan, $5000; Claude F. Garesche, National Lead vice-president, $5000; Gustav Jensen, Titan vice-president, $5000; and the Du Pont company, $8000.

Since the case began, Du Pont has announced the development of a process for making metallic titanium. The metal is twice as light as aluminium, but has more tensile strength. It is abundant chemically, but difficult to refine from its ores.

Parliamentary Topics

Price of Linseed Oil.—Col. J. R. H. Hutchinson asked the Minister of Food whether he was now in a position to reduce the price of linseed oil to industry. Mr. Strachey said the price of linseed oil will be reduced to £170 per ton from March 6.

Purchase Tax.—In reply to a question by Mr. I. J. Pitman, asked of the Chancellor of the Exchequer, Mr. Douglas Jay, Economic Secretary to the Treasury, in a written answer, said the estimated yield from purchase tax in 1948, out of a grand total of £300 million, on drugs and medicines was £10.8 million. Mr. Jay also gave the estimated yield from 35 other articles.

Antrycide.—Major Simon Ramsay asked the Secretary of State for the Colonies whether every precaution is being taken to prevent the development of races of trypanosomes immune against antrycide, in view of the fact that immune races have developed in the case of previous drugs. In a written reply, Mr. Creech Jones said: "Yes. My advisers are very conscious of this possibility. The use of antrycide is being controlled initially by Government veterinary departments largely for this reason."

Sorbitol Supplies.—Brigadier C. H. M. Peto asked the Minister of Food what were the prospects of increasing the amount of diabetic chocolate which can be made available for sale by chemists. Mr. John Strachey replied that he was afraid there was little prospect at present of obtaining additional supplies of Sorbitol, which was an essential ingredient in diabetic chocolate. Brigadier Peto then asked if the Ministry of the right hon. gentleman or the Ministry of Health was responsible for the restriction. Mr. Strachey replied: "I think we are responsible for the supply of ingredients."

Iron and Steel Exports.—Mr. William Shepherd asked the President of the Board of Trade why Canada received in 1948 less than half the quantity of iron and steel, including railway tyres, etc., from this country as compared with 1938, whereas the U.S.S.R., Sweden and Finland have received many times the 1938 volume. Mr. H. Wilson, in reply, said the steel made available in 1948 to the Soviet Union, Sweden and Finland was in each case supplied in order to secure agreements necessary to safeguard essential supplies and our financial reserves establishing an approximate balance of overall trade. This did not, however, prevent us from sending Canada more steel (excluding tinplate) in 1948 than before the war, and we hoped to ship more steel to Canada in 1949 than to any other overseas market.

Official Prices Reduced

THE Board of Trade has announced that the prices of rosin, turpentine and pine oil sold through the agency of the United Kingdom Naval Stores Association, Ltd., 46 St. Mary Axe, London, E.C.3, will be reduced in respect of most grades, owing to a reduction in producers' prices. The new prices, which are back-dated to March 1, are as follows (with the previous price in brackets):—

GUM ROSIN	per cwt., ex-store
Medium Pale	51/6 (54/–)
F/M	54/6 (57/–)
N/WG	56/– (58/–)
WW	57/6 (59/–)
X/WW	58/6 (59/6)
Y	59/6 (59/6)

WOOD ROSIN	per cwt., ex-store
B	24/– (30/6)
FF	37/6 (44/–)
NWG	47/– (54/–)
K/M	46/– (53/–)
WW	48/– (55/–)
Vinsol	41/– (48/–)
Polymerised	58/– (65/6)
Corex	32/– (34/–)
Speros	37/– (43/–)
Melhi	34/– (36/–)

50-ton lots purchased on cost and freight terms with marine insurance covered will be at the above prices less £2 per ton for all grades, when availble.

TURPENTINE	per cwt.,	ex-stock
U.S.A. gum spirits	67/–	(74/–)
Portuguese gum spirits	63/–	(64/–)
U.S.A. wood turpentine	60/–	(60/–)

The price of pine oil will be reduced from £70 to £60 per ton net naked *ex* U.K. Store in loaned 45 gal. drums. For smaller quantities the prices will be: 5-gal. free drums *ex* warehouse—7s. 9d. per gal.; 10-gal. free drums *ex* warehouse, 7s. 3d. per gal.

Chemicals Exempt from Duty

The Treasury has made an order under the Finance Act, 1926, exempting sodium pyrophosphate and microfilm, dutiable only by reason of containing cellulose acetate as an ingredient, from Key Industry Duty for the period beginning February 28, 1949, and ending June 30. The order is entitled "The Safeguarding of Industries (Exemption) (No. 1) Order, 1949." The Treasury has also made an order under the Import Duties Act, 1932, exempting microfilms of documents from duty under the Import Duties Act, 1932.

The effect of these orders is that sodium pyrophosphate will be chargeable only with the 10 per cent general *ad valorem* duty, while microfilms of documents will be exempt from all duty. The exemption of the latter does not extend to cinematograph film nor to microfilms of trade advertising material.

RISING TONNAGES IN GERMANY

ERP Eases Raw Material Shortages

THE gathering speed of recovery in Western Germany is reflected by the latest figures of chemical production in the Anglo-U.S. occupation zone. In January the fertiliser production included 53,300 metric tons of K_2O, 20,200 tons of N, and 25,000 tons of P_2O_5, compared with 32,600, 16,600 and 16,600 tons in the monthly average of 1948.

The production of sulphuric acid rose from 51,800 tons (SO_3 content) to 70,200 tons, sodium carbonate from 31,400 tons (Na_2CO_3) to 47,300 tons, and caustic soda from 12,900 tons (NaOH) to 17,200 tons; calcium carbide alone among major chemicals declined from a monthly average of 27,900 tons (CaC_2) in 1948 to 24,600 tons in January, 1949.

The demand for inorganic heavy chemicals from rayon, paper, glass and soap manufacturers, however, has risen even more steeply.

Fatty Acids

Fatty acid imports into Western Germany have now set in on a substantial scale under ERP auspices. In the first ERP year, however, imports of 36,000 tons only are expected, compared with estimated requirements of 100,000 tons, while the comparable pre-war figure is given as 200,000 tons for the Anglo-U.S. zone.

During the second ERP year 60,000 tons of fatty acid are to be imported, of which 10 per cent will be diverted to industrial purposes, the manufacture of shampoos, etc. The bizonal soap production amounted to 3200 tons in January, against the monthly average of 2500 tons in 1948.

Activity in the West German coke-oven industry increased considerably last year. In addition to 20.3 million tons of coke (1947: 14 million tons), the Anglo-U.S. zone produced 715,719 (505,718) tons of crude tar, 201,673 (140,610) tons of crude benzol and 234,698 (154,122) tons of ammonium sulphate. The production of the latter is still causing difficulty owing to a shortage of sulphuric acid, which is in any case so expensive that the manufacture of ammonium sulphate is not remunerative at present. Coal-tar distillers are also very active.

Tar Chemicals

In 1948 British zone distilleries, largely concentrated around the Ruhr area, treated 689,285 tons of crude tar and produced 375,878 tons of coal-tar pitch, 265,958 tons of tar oils, 10,500 tons of crude naphthalene, 5920 tons of pure naphthalene, 1558 tons of anthracene (40 per cent), 11,527 tons of anthracene residues, 2362 tons of phenol, 4862 tons of cresols and xylenols, 52 tons of pure pyridine, 142 tons of new-test pyridine and 121 tons of other pyridine bases. Small quantities of impregnating oils, naphthalene, anthracene and road-tar, were exported, largely to the U.S.A. Their value totalled $1,126 million in 1948.

Acid Shortage Persists

Considerable importance continues to be attached in the Soviet zone of Germany to imports of chemical raw materials. During January and February this year 42,000 tons of superphosphates and 20,000 tons of pyrites arrived in the eastern zone. The shortage of sulphuric acid is still intense and is reported to have led to mass dismissals at the Leuna plant.

PLANTS TO BE ALLOCATED

THE Office of International Trade, U.S. Department of Commerce has announced the receipt of official inventories of two German chemical plants declared available for reparation from Germany, and has sought offers from American firms, if the plants are allocated to the U.S.A. The plants are likely to be allocated on or after March 19. They are the Ruhr-chemie A.G., part plant comprising the section, complete with instruments, for the production of toluene from octane heptane, located at Oberhausen-Holten; and the Oxo-gesellschaft m.b.H. plant at Oberhausen, for the production of higher aliphatic alcohols.

MUSHROOM DEVELOPMENT

REPORTS derived from Western Germany on conditions in the German pharmaceutical industry suggest there was a mushroom growth of factories and wholesalers from 1946 until the currency reform in the middle of 1948. The introduction of the deutsche mark is said to have brought this development to an abrupt end and some of the newer establishments have had to be liquidated. Well-known companies introduced a considerable number of new products and in no other branch of the German economy has competition become as keen as in the pharmaceutical industry, it is stated.

The Physical Chemistry of Dyeing

Differing Mechanisms for Various Fibres

AT the monthly meeting of the London Section of the Society of Chemical Industry, held in London on Monday, Dr. T. Vickerstaff, M.Sc., A.R.I.C. (I.C.I., Ltd.), gave an address on "The Physical Chemistry of Dyeing."

Dr. Vickerstaff first drew attention to the present-day conception of a fibre as being a linear arrangement of polymer molecules, some of which are crystalline and others amorphous. The swelling of a fibre in water is due mainly to the swelling of the amorphous part and it is in a similar way that the dye solution enters the fibre.

In the case of wool, 95 per cent of the dye in a bath may be transferred to the fibre and it is thus obvious that some other mechanism must also be operating, otherwise the process would stop when equilibrium was reached with 50 per cent of the dye adsorbed.

Acid Dyes

It is necessary to invoke different mechanisms for different fibres. Wool, however, is essentially a protein being dyed with acid dyes. The most common dyes of this class are the azo, anthraquinone and triphenylmethane types and the only characteristic which they have in common is that all contain a strongly acid grouping, usually the sulphonic acid group.

The wool fibre is made up of polypeptide linkages ...CO-NH-CH-CO-NH... and

the nature of the side chains R may be divided conveniently into four groups: 1. hydrogen, alkyl or hydroxyl groups, which will have little effect on the process of dyeing. 2. Sulphur linkages, fission of which between two polymer chains makes dyeing easier and quicker. 3. Acid residues, *e.g.*, glutamic acid, basic residues, *e.g.*, lysine.

The last two types provide active groups which may react with the type. That this is the case may be shown by titration with hydrochloric acid when the results obtained agree well with the analysis of the constituent amino acids. It is found that for wool there are 0.8 equivalents (of basic groups) per kilogram of fibre, but for nylon the corresponding figure is only 0.04.

A value of 0.8 equivalents corresponds to a 30 per cent dye bath and since baths are usually of the order of 1-3 per cent, it is apparent that in practice the dyer is never working near the saturation value of wool.

Silk is a similar case, but nylon, having a value of only 0.04, corresponds to a 1.5 per cent bath, and hence the saturation value of nylon is often reached in practice. This has important consequences where nylon is being dyed from a mixed bath and the different dyes have varying affinities for the fibre.

Superficially, it might appear that dyeing was simply acid base neutralisation, but this is not the whole story, partly due to the charge on the protein; in the case of cotton (cellulose) the position is simpler.

The speaker proceeded to show that dyeing follows normal thermodynamic laws and that one could calculate the affinity, heat of reaction and entropy, etc. It was hoped that by determining the affinities of various dyestuffs a table of affinities might be constructed which would assist the practical dyer in choosing suitable dyes for mixed baths without the necessity of carrying out dip tests.

The other main factor in any dyeing operation was the rate of dyeing, determined by the diffusion coefficient of the dye in the fibre. Such rates were determined in a bath of constant dye strength, *i.e.*, a large volume of dye solution to a small weight of fibre.

The Mixed Bath

It was pointed out that in a mixed bath one might expect that the dye with the smallest time of dyeing would be absorbed first. This, however, was not always the case, as one dye might be accelerated and the other slowed. The important criterion was the saturation value for each dye since they would compete for the surface of the fibre in the ratio of their saturation values.

Radioactivity Weaving Test

The first practical adaptation of radioactivity to textile industry is now being tried out in the Yorkshire and Lancashire mills, according to the *Yorkshire Post*.

A radioactive substance placed on one side of the cloth as it was woven and a monitoring device on the other, made it possible to record the degree to which the material absorbed radiation and from that to check the thickness of the cloth at a given point. Any irregularity in the quality of the cloth could then be adjusted before it had gone too far, and usually, without stopping the loom and delaying production.

A section of the BIF is to be devoted to an atomic energy exhibit. Buyers will be shown how radioactive isotopes can be utilised in medicine and industry.

REAL WOOD ALCOHOL

French Process to Employ Waste Timber

From a Special Correspondent

A CONTEMPORARY paradox of chemical industry is the fact that only a small percentage of the world's supply of wood alcohol is derived from wood. Almost all this highly important chemical is manufactured synthetically from coal, coke or natural gas.

The prospect of radical change in this situation was contained in the recent completion of a pilot plant employing the Lacotte process for the gasification of wood, the first step in the synthetic production of methanol. The pilot plant was constructed by the French Société Aveyronnaise de Méthanol at their Decazeville plant. Early results indicate that this process may be of significance in the utilisation of marginal wood supplies for the manufacture of economically competitive methanol.

Until 1923, methanol was a by-product of the destructive distillation of wood. The supply was naturally limited and the price high. Most of the wood alcohol was then utilised as a denaturant for ethyl alcohol.

An increasing portion of the "natural" methanol went into the manufacture of synthetic organic chemicals. The real expansion of this field did not, however, become possible, until the precipitous price decline of methanol was brought about by the introduction of synthetic processes which account to-day for nearly 95 per cent of the world's total methanol production.

Credit for the early development of synthetic alcohol production goes partly to the French, partly to the Germans. Probably the first workable process was reported by Patard (French Patent 540,343 (1921)) who patented the high-pressure, high-temperature reaction of carbon monoxide and hydrogen in the presence of certain metals and metal salts which are known to have a catalytic action in oxidation and hydrogenation reactions.

Synthetic Methanol

Industrial development came in 1923, with the erection of the world's first synthetic methanol plant at Ludwigshafen by Badische Anilin- and Sodafabrik, principal parent company of the I. G. Farbenindustrie, which was formed shortly afterwards.

Vast progress has been made since this first industrial synthetic wood alcohol installation. The operation of the synthesis phase of the process is well established. Generally, pressures up to 4500 p.s.i. and temperatures ranging around 400°C. are employed. A commonly favoured catalyst is a supported mixture of zinc and chromium oxides.

While the reaction $CO/CH_2 = CH_3OH$ accounts for the greater portion of the synthetic methanol manufacturing processes, the synthesis from carbon dioxide and hydrogen is also industrially feasible: $CO_2/3H_2 \longrightarrow CH_3OH/H_2O$. The ratio of hydrogen to carbon oxide employed industrially corresponds to the theoretical requirements, *i.e.*, for the reduction of carbon monoxide, two volumes of hydrogen are fed to the reactor with every volume of carbon monoxide. Three volumes of hydrogen are required to reduce one volume of carbon dioxide to methanol.

The Synthesis Gas

The greatest single cost item in the manufacture of methanol is in the production of the synthesis gas—the sulphur-free mixture of hydrogen and carbon oxide. The more common raw materials employed prior to the last war were coke and natural gas. Water gas was produced from coke by the action of steam in so-called "water gas machines." The production of water gas (carbon monoxide and hydrogen) in this type of equipment is intermittent; the operating cycle is completed by the preheating of coke to the necessary high temperatures by means of air and by an intermediate steam-purging period.

Natural gas, on the other hand, is reacted with steam in catalytic converters which are heated externally by fuel gas. During the war, the continuous gasification of coal has been developed to a point where coal may also be looked upon as a direct raw material for the production of water gas.

Synthesis gas with the proper hydrogen content can be readily manufactured from water gas by judicious reaction with steam over an iron oxide catalyst.

Where synthesis gas is prepared from coal, coke, or natural gas, a particularly significant cost item is the removal from the gas of sulphur, which is capable of destroying the usefulness of the catalyst.

The existing methods, employing oxides of zinc or iron and sodium carbonate, require comparatively large equipment and add substantially to gas producing costs.

This problem would, of course, be eliminated if the raw materials employed were free from sulphur. Ideally suitable for this purpose is low-grade timber in forest-rich

areas. The Lacottee process which is now being studied at the Decazeville pilot plant is based on this consideration. Its aim is the production of natural wood alcohol and other products of the destructive distillation of wood, followed by the gasification of the residue and conversion to methanol of the gas—which does not contain any sulphur or other deleterious substances.

The Gasification Process

The Lacotte gasification unit consists of a burner and a producer in two sections, the latter superimposed on the burner. The wood is roughly cut and introduced into the upper section of the gas producer where it is contacted with hot gases from the burner and is thus preheated to 900-1000° F. All the distillate is driven from the wood which enters the lower section of the producer in the form of charcoal.

The distilled gases consist primarily of methane plus carbon monoxide and hydrogen and carbon dioxide derived from the heating gases. The overhead of this distillation also contains some methanol and acetic acid which may be condensed out and recovered.

The non-condensible gases are passed to the burner where they are mixed with oxygen and steam. The subsequent combustion raises the temperature of the product gases leaving the burner to 2000° F.

The hot gases enter the centre section of the gas producer. Here they are divided into two streams. One stream passing upwards contacts and pre-heats the fresh wood, causing the distillation and carbonisation action described.

The remainder of the hot gases from the burner passes down through the charred wood in the lower section of the gas producer. The steam, oxygen, and carbon dioxide present in the gas react with the wood at the high temperatures existing in this section and gasify it effectively.

The product gas leaves the bottom of the gas producer. According to M. Delaunay, it contains 30 per cent carbon dioxide, 63 per cent carbon monoxide and hydrogen and small amounts of methane and nitrogen.

If the temperatures in the gasifier are properly controlled and the steam ratio judiciously adjusted, the ratio of hydrogen to carbon monoxide in the product gas will already correspond to the requirements of the methanol synthesis. It is then only necessary to scrub out carbon dioxide by the use of water under pressure or by means of an alkaline solution, and to compress the synthesis gas to reaction pressure.

Fuel Saving

Moisture content of the wood is not of critical importance in the operation of this process. The pre-drying of the charge does, however, result in some saving of the more costly fuels and can be carried out with the cheapest available heat source.

Delaunay reports that one ton of dry wood will eventually yield about 70 gal. of methanol.

This process is promising for wood-rich areas where small timber is available cheaply. After a quarter century in obscurity, wood is once more looked upon seriously as a raw material for the production of wood alcohol.

Electrolytic Method of Gas Analysis

An improved electrolytic cell for continuous determination of a gas mixture constituent is claimed by Mfrs. de Prod. Chim. du Nord Etab. Kuhlmann. It comprises a reference cell and measuring cell forming an integral part of a thermostatic sleeve in which they are immersed. Each cell has two platinised platinum electrodes. The reference cell is surrounded by a coiled tube connected at one end to the lower part of the cell and at the other end to the electrolyte feed pipe.

The measuring cell is also surrounded by a coiled tube connected at one end to the central part of this cell and at the other end both to the lower part of the cell and also to the reference cell through a capillary tube which penetrates halfway up the reference cell, and from which branches a second capillary tube open to the atmosphere.

An inlet pipe is also provided for the gaseous mixture under test, connected to the end of the coil surrounding the measuring cell, and adjoining the capillary tube connecting the cells. Two outlet pipes are provided in the measuring cell, one for the gas and the other for the electrolyte.

The apparatus has a glass container of low thermal expansion. The spacing of the two electrodes in the measuring cell is adjustable. Other constructional details are given with reference to diagrams. An improved method is claimed by means of this aparatus for securing the constant flow of the gas mixture. All constituents which may be capable of affecting measurement are readily removed, *i.e.*, by chemical change, so that only the constituent which is to be determined is soluble in the electrolyte. Other advantages are claimed. (English Patent application No. 24442/1947; Conv. date 17.6.47.)

IMPROVED HYDROCARBONS SYNTHESIS

Patent for "Fluidised Bed" Principle

THE improved method for the reduction of a carbon oxide, especially CO, with hydrogen, to form hydrocarbons, using the Fischer-Tropsch synthesis and a fluidised catalyst (THE CHEMICAL AGE, *56*, 115), is claimed by the Standard Oil Development Co. in the English patent application No. 4538/1948.

The catalyst is in finely powdered form arranged in beds through which an up-current of gas or vapour is passed to maintain a dense turbulent mass. This offers many advantages over the usual catalysts of the iron group—iron, nickel, cobalt—either alone or on a carrier, with or without promoters.

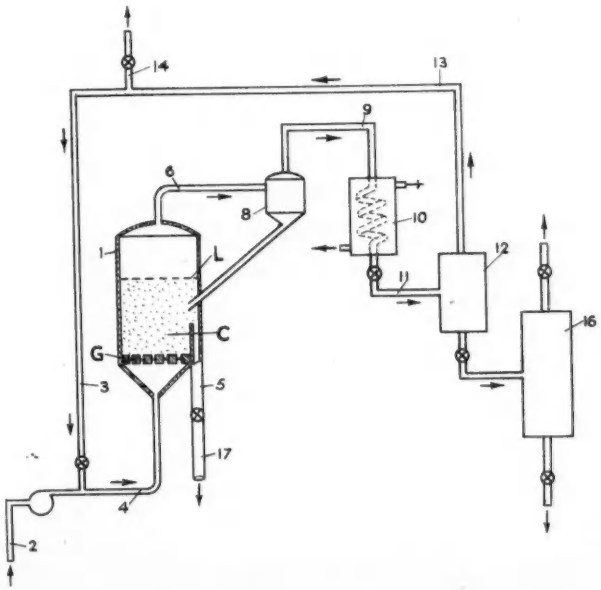
In the present instance the difficulty presented by deposition of carbon on the catalyst has been eliminated by use of relatively high pressure in the reaction zone, ranging up to approximately 400 p.s.i., together with high hydrogen partial pressure. Physical disintegration or other deterioration of the catalyst is also avoided. Operating conditions are controlled to give, per cu. m. of CO and H mixture, a minimum yield of 190 c.c. butane and higher boiling constituents, or a minimum yield of propane and higher boiling constituents. The temperature of reaction should be 650-725° F.

The catalyst may be any of the suitable Fischer type (iron group), or iron base, such as the synthetic ammonia catalyst, pyrites ash catalyst, reduced red iron oxide, etc.

Catalytic Conversion of Naphthalene

In the course of the article "Some Developments in the Heavy Chemical Industry" (reviewing 1947—THE CHEMICAL AGE, *58*, 42) it was stated that J. A. Lee had applied the fluid technique to the catalytic conversion of naphthalene to phthalic anhydride. It has since been shown that this passge was a reference to one part of the development by the Sherwin-Williams Company, of Chicago, of the fluid catalyst technique. J. A. Lee was the authority for the report, not the originator of the process.

1.—Reactor with grid G and catalyst C
2.—Feed line
3.—Recycle line
4.—Total feed
5.—Upper part of exhaust
6.—Product vapour exhaust outlet
8.—Separator
9.—Connection to cooler
10.—Cooler
11.—Feed from cooler
12.—Separator
13. } Gaseous material withdrawn
14. }
15.—Receiver inlet
16.—Receiver
17.—Exhaust



Advantages of Climbing Film Stills

Means of Successful Distillation of Heat Sensitive Materials

A JOINT meeting of the North-Western Branch of the Institution of Chemical Engineers and the Liverpool Section of the Society of Chemical Industry was held at the university of Liverpool recently at which Mr. E. J. Dunstan, chairman of the branch, presided. A paper, "Developments in the Use of Climbing-Film Stills for the Distillation of Heat-Sensitive Materials," was presented by Mr. C. H. G. Hands, B.Sc., and Mr. W. S. Norman, M.Sc.

Decomposition Problems

The authors discussed the problem of the distillation on the pilot plant scale of 2:3 dithio propanol (BAL) and of crude dichlorodiethyl sulphide (Mustard Gas, HM), which decompose on heating. Normal methods of distillation of these materials are inefficient because the heating surfaces become fouled by their decomposition products.

Two methods of treatment for heat-sensitive materials are: Molecular distillation, and distillation under vacuum with a very short time of heating, using the climbing-film technique.

Molecular distillation of these substances was ruled out on economic grounds, but the second method gave high outputs from a small apparatus of simple construction. The climbing-film still consists of one or more vertical tubes surrounded by a heating jacket. The liquid is introduced at the bottom of the tube where it starts to boil and forms a rising froth of liquid and vapours; higher up the vapour forms a continuous central core and carries up the liquid as a rippling film on the tube wall. At the top of the tube the liquid is discharged into a separator, the liquid residue is collected in a receiver and vapour product is condensed. One passage through the tube may separate nearly all the volatile fraction in a few seconds.

Crude BAL contains 70-80 per cent BAL and 20-30 per cent of higher boiling impurities. In preliminary experiments crude BAL was passed into a glass tube of ¼ in. bore, 2 ft. long. The tube was fitted with a jacket containing oil at 200° C. The absolute pressure was 3-4 mm. of mercury.

When the vapour temperature was 180° C. at the top of the tube, the distillate contained 10 per cent of higher boiling material, but with higher rates of distillation with a vapour temperature of 135° C. at the exit, 80 per cent of practically pure BAL was recovered. The liquid residue was distilled at 180° C. exit temperature and the impure product purified by re-distillation.

Following this preliminary work, a two-stage vacuum distillation process was used to produce four cwt. per week of BAL. Each glass evaporator tube was ¾ in. bore and 5½ ft. long, mounted on a jacket through which hot oil from an external heater was circulated at 230° C. The oil was cooled rapidly at the end of each run to prevent the decomposition of the BAL on the walls of the evaporator tube. Pre-heated and filtered crude BAL was introduced into the evaporator tube and the hot liquid residue separated, while the vapour product was collected and condensed and collected as BAL. The residue from the first stage was re-distilled in the second and the product re-circulated with the crude BAL.

Mustard Gas

Crude mustard gas (HM) contained 70-80 per cent dichlorodiethyl sulphide, 10-15 per cent monochlorbenzene (MCB) and 10-15 per cent undistillable residue. One ton per week of partially purified material was required and was obtained by the distillation of HM in a climbing-film still using MCB as an entrainer.

VACUUM ADAPTOR VALVE

SAID to be superior in many ways to multiple stopcock types commonly employed in pharmaceutical, essential oil, petroleum and other laboratories, a new type of glass vacuum adaptor for fractional vacuum distillation has been announced by the Scientific Glass Apparatus Company, Inc., Bloomfield, New Jersey.

Most vacuum distillations involve the separation of distillate into a number of fractions which must be removed from the apparatus without disturbing the vacuum within the still itself. While other adaptors do this through the manipulation of three or four stopcocks, the new adaptor contains no stopcocks and accomplishes the same result through use of an internal glass valve which is automatically lubricated by the distilling fluid. All manipulation is in a three-way stopcock in the pump system.

In operation, the system is evacuated through the adaptor and three-way stopcock, which does not require cleaning after each distillation. When the receiver is to be removed, the stopcock is turned 90° to admit air into the receiver. The inrushing air automatically closes the valve so that no air gets into the rest of the system.

As soon as an emptied receiver is evacuated to the same pressure as the rest of the system, the valve falls into the open position.

RUBBER LININGS FOR CHEMICAL CONTAINERS

Varied Uses and Applications

By JAMES P. LAWRIE, Ph.D.*

THE chemical and allied manufacturing industries are turning with increasing frequency to the use of rubber as a lining for containers, plant and equipment. A decided advantage lies in the comparative ease with which rubber can be applied *in situ* as a lining or coating to tanks and other equipment already erected. Economy too, enters as an important factor—rubber is cheaper for example, than lead as a liner and, where the nature of the process and the materials to be handled render it suitable, infinitely cheaper than electro-deposits of various metals.

In the case of bulk transport of corrosive liquids such as hydrochloric acid, rubber-lined tanks are perhaps the most satisfactory answer. An obvious advantage is that the flexibility of the rubber enables it to withstand the jolting of transport without yielding at joints. Storage tanks for hydrochloric acid may be of wood or metal, lined with rubber sheeting, which can be applied in thicknesses of about 2·4 millimetres in either hard or soft rubber according to the conditions which have to be met in use.

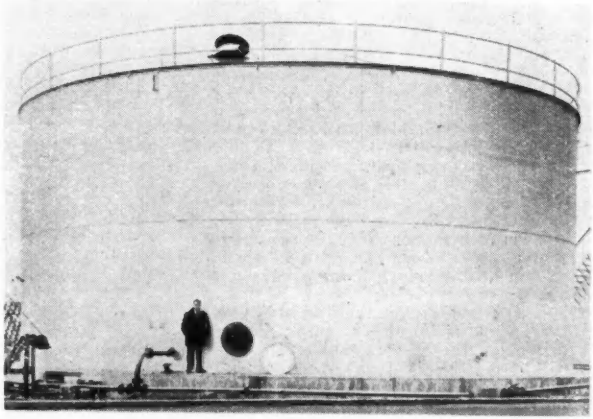
The vessel is thoroughly cleaned by suitable methods, such as sand-blasting, and the rubber sheeting and the walls of the vessel coated with adhesive solution. After a lapse of time, during which the solvent dries off, the sheeting is placed in position, like wallpaper, and pressed into close contact with hand rollers to expel entrapped air.

Rubber is, wherever possible, vulcanised under pressure, a proceeding which avoids porosity and the formation of bubbles due to moisture or occluded air, the temperature being slowly raised, in the case of open vessels, by the use of steam heated water or brine.

The use of rubber linings is naturally decided by the chemical resistance of the rubber to the materials to be handled and, in view of the fact that few materials are perfectly free from impurities it is as well to check any possible action by the simple process of hanging a number of strips of the metal, coated with suitable rubber mixes, in the liquid at the necessary temperature and examining them after an interval. If suitable, the rubber should be unaffected and, of equal importance, the stripped metal should be free from corrosion.

The wide range of rubber mixes now available makes it possible to obtain the correct type for the majority of materials handled and, in "Rubber in Chemical Engineering" (British Rubber Development Board) Stevens and Donald include these

* The British Rubber Development Board, Mark Lane, London, E.C.3.



What is believed to be the largest rubber lining task in this country was undertaken recently by the Dunlop Rubber Co. on this 320,000 gal. tank. Nearly five tons of rubber, including adhesive, will be used for the lining, which is being carried out with the aid of several manholes

ACID RESISTANCE OF HARD AND SOFT RUBBERS

	Concentration by weight	Maximum Temperature °F	Maximum Temperature °C	Rubber	Design of compound, for general or specific service
Arsenic acid	Any	150	65	Soft	Specific
Carbonic acid	Up to saturation at atmospheric pressure	150	65	Hard	General
Chlorine water	Up to saturation at atmospheric pressure	100	38	Soft	Specific
Fluoboric acid	Any	150	65	Soft or hard	General
Fluorsilicic acid	Any	150	65	Soft or hard	General
Hydrofluoric acid	Up to 50 per cent	150	65	Soft or hard	General
Hydrochloric acid	Any	150	65	Soft or hard	General
Phosphoric acid	Up to 85 per cent.	150	65	Soft or hard	Specific
				Hard	General
Sulphuric acid	Up to 50 per cent	150	65	Soft or hard	General
Sulphurous acid	Up to saturation at atmospheric pressure	150	65	Hard	Specific

The authors of the table from which these representative examples are taken point out that it must be interpreted in accordance with requirements—a tank lining to last for years needs strict interpretation but in the less severe requirements of much chemical plant soft rubber can often be substituted for hard rubber, as in the case of acetic acid of moderate strength.

It is thus apparent that rubber is a suitable liner for vessels to contain materials such as those listed above, amyl alcohol, castor oil, furfural, glycerine, methyl alcohol, mineral oils, tartaric acid, vinegar, etc. Even gases such a sulphur dioxide can be handled using rubber and it provides an excellent protective layer for pickling or etching baths, plating solutions, photographic solutions, dyes, ammonia salts, etc.

Use of Latex

An alternative method of lining tanks and containers with rubber, of perhaps more limited application, lies in the use of latex, which may be deposited by spraying or dipping until the desired thickness is obtained. This method offers many advantages in that larger and more awkwardly shaped equipment can be treated. When spraying is completed the moisture content of the latex is dried off and the deposit vulcanised as a continuous sheet or covering.

Chlorinated rubber is marketed under a variety of names and finds increasing application in industry. The unsaturated double bonds of the rubber hydrocarbon molecule take up chlorine in the same manner as sulphur is taken up during vulcanisation and, as chlorine will also displace hydrogen in the form of hydrogen chloride, the chlorine content can be increased up to about 66 per cent of the weight of the chlorinated rubber.

Chlorinated rubber has the desirable property of being taken up in much greater proportion in the usual organic solvents without great increase in the ultimate viscosity. It is insoluble in water, petrol, alcohols, glycerol and mineral oils and can be made, by complete chlorination, into a product not oxidised by air, the surface of the film being very tough and elastic. In paints, for example, chlorinated rubber gives ten times as much resistance to the passage of water vapour.

OIL RESISTING RUBBERS

IN a paper on the employment of rubbers as engineering materials, read recently to the Hull Association of Engineers, **Mr. L. Jenkins**, of the Dunlop Rubber Company's general development division at Fort Dunlop, said that to many people the idea of classifying rubbers as engineering materials would savour of the incongruous.

He went on, however, to classify natural and synthetic rubbers into nine distinct and clearly defined groups and indicated that perhaps the most important of these to the engineer were the rubbers of groups one (isoprenes); two (chloroprenes); and three (butadienes). They were all chemically related and all vulcanisable, yielding high-class, stable compounds.

The rubbers of group two, the neoprenes, were oil-resistant, some having good oil resistance, while others had super oil resistance. Group three rubbers could be obtained in three forms; the first had an oil resistance no better than that of natural rubber, the second form had a good oil resistance, while the third again had super oil resistance.

It was necessary, he explained, to consider these degrees of oil resistance because one of the most important properties affected by change in oil resistance was the resistance to low temperature. The higher the resistance of oil, the higher the temperature at which the rubber freezes and goes brittle.

Indian Penicillin.—£1.5 million is the estimated cost of the penicillin factory which the Indian Government proposes to set up at Bombay.

Production and Stocks of N-F Metals

THE following particulars of production, stocks, consumption, imports and exports of non-ferrous metals in the United Kingdom in January are extracted from the monthly figures supplied by the British Bureau of Non-Ferrous Metal Statistics.

UNWROUGHT COPPER

	Long Tons	
	Blister Copper	Refined Copper
OPENING STOCKS:		
Govt. and consumers'	36,401	84,320
Imports into U.K.	8,069	19,226
PRODUCTION:		
Primary	—	8,780
Secondary	1,521	7,369
CONSUMPTION:		
Primary	8,816	28,504
Secondary	—	15,211
EXPORTS FROM U.K.	2,711	365
CLOSING STOCKS:		
Govt. and consumers'	33,698	81,651

GROSS OUTPUT OF MAIN COPPER, ALLOY AND PRODUCTS

Unalloyed copper products	27,364 long tons
Alloyed copper products	23,114 „ „
Copper sulphate	3,096 „ „

UNWROUGHT ZINC

	Long Tons	
	Zinc in Concentrates (estimated gross Zinc content)	Slab Zinc (all grades)
OPENING STOCKS:		
Govt. and consumers'	14,468	46,709
Imports	9,084	6,249
PRODUCTION:		
Virgin and remelted	—	5,077
CONSUMPTION:		
Virgin (incl. debased)	5,973	17,091
Remelted and scrap	—	7,118
EXPORTS	—	35
CLOSING STOCKS:		
Govt. and consumers'	17,579	39,929

LEAD

	Long Tons			
	Lead in Concentrates	Imported Virgin Lead	English Refined	Lead Content of secondary scrap and Residues
OPENING STOCKS:				
Govt. and consumers' ...	—	17,070	2,890	—
IMPORTS	—	19,423	—	—
PRODUCTION ...	146	—	3,213	—
CONSUMPTION ...	146	13,330	4,076	10,340
Exports	—	117	—	—
CLOSING STOCKS:				
Govt. and consumers' ...	—	21,422	2,027	—

TIN METAL

	Long Tons
GOVT. AND CONSUMERS' STOCKS AT END OF PERIOD	13,609
IMPORTS	—
PRODUCTION	2,853
CONSUMPTION	1,857
EXPORTS AND RE-EXPORTS	181

ANTIMONY

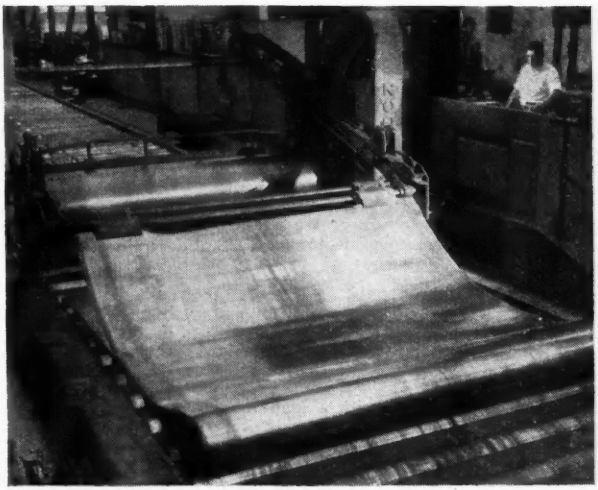
	Long Tons
TOTAL CONSUMPTION OF ANTIMONY METAL AND COMPOUNDS	416
TOTAL CONSUMPTION OF ANTIMONY IN SCRAP	359

CADMIUM

	Long Tons
TOTAL CONSUMPTION OF CADMIUM	47.30

BILLET to SHEET

Breaking down a 12-ton lead " billet " to thin sheet lead of 8 ft. width in a rolling mill at the Millwall (London) factory of Associated Lead Mfrs., Ltd. This is one of the many excellent illustrations in a booklet which the company has issued. The story is told of the activities of the companies, which, having been closely integrated for a number of years, at the beginning of this year arranged closer collaboration under a common title



Corrosion of Metals

Some Contributing Factors

IN the second Cantor lecture, presented before the Royal Society of Arts (February 28), Dr. Vernon noted that corrosion can be easily avoided in some cases by attention to simple principles in structural design. Contributing factors may be contacts of dissimilar metals, or association of metallic and non-metallic materials. For example, the combination of lead and unseasoned oak leads to rapid corrosion.

Electrical cathodic protection by means of external anodes of magnesium, aluminium, zinc or scrap iron may be employed where sea-water or underground corrosion occurs. The alkali produced at the cathode precipitates a calcareous protective coating over the whole of the surface. In natural waters and neutral solutions, where oxygen is responsible for corrosion, suitable methods of de-aeration can be used.

Sodium Benzoate

The impregnation with sodium benzoate of wrapping materials is effective protection against moisture penetration, and is particularly suitable for tropical climates because of its mould-resisting properties.

Tests have shown that steel articles wrapped in impregnated paper remain bright under conditions in which the paper becomes soaked with condensed moisture.

Rubber latex similarly impregnated is also a simple remedy, and the film may be pulled off easily at any convenient time. In the absence of benzoate, however, rusting quickly develops beneath the rubber.

Much work on surface treatment by chemical and electro-chemical methods is also being done at present with success, and the anodic oxidation of aluminium in this connection is specially noteworthy.

In stainless steel corrosion resistance is attributed to the chromium content and resultant high polish, and in low alloy steels copper is known to have excellent protective properties. Anti-corrosion coatings which can be applied to metals include "cementiferous" paints, which represent a new departure and hold considerable promise.

Chemical Resistant Mastic.—Tretol, Ltd., manufacturers of building materials and paints, have applied for the patent rights of a new jointing, sealing and pointing mastic, Tretol caulking compound, which has great powers of adhesion. The manufacturers claim that this material, with a high resistance to most acids, alkalis, and other chemicals, will fulfil a definite need in industry. It withstands temperatures as high as 325°F. and can be overpainted.

Hot Dip Galvanising

New Association Formed

THE Zinc Development Association has announced the formation of the Hot Dip Galvanisers' Association, a non-trading body operating from the ZDA headquarters, which has been set up to promote the development of existing and new uses of hot dip galvanised coatings, and to improve galvanising technique. The council of the association has elected Mr. F. C. Braby as its first chairman, and Mr. A. H Thompson as deputy chairman. A strong technical committee, under the chairmanship of Mr. Thompson, has been appointed to deal with the important programme of scientific work. There are 12 founder member firms.

The first publication of the association "Hot Dip Galvanising and Rust Prevention" has just been issued in the form of an amply illustrated booklet of 51 pages. The process of galvanising (which derived its name from the Italian physiologist Luigi Galvani, 1786), is explained and its many uses and characteristics are detailed, while the concluding section is devoted to the properties of good galvanised coatings.

U.S. LEAD TOTAL

DESPITE a continued high industrial demand for lead and an all-time record high market price, the mine output of recoverable lead in the U.S.A. in 1948—386,932 short tons—was little greater than in 1947. That was revealed last week by the U.S. Bureau of Mines, in the preliminary annual figures for 1948. Output in 197 was 384,221 short tons. Work stoppages due to labour-managements disputes curtailed lead outputs in certain areas and were the greatest single factor impeding output. One stoppage lasting 11 weeks in South Eastern Missouri was estimated to have been responsible for the loss of 25,000 tons of lead.

At the average yearly price, the 1948 domestic mine output was valued at $135,426,200, which compares with a value of $110,655,648 at the lower price in 1947.

Physical Science Research

An offer of £10,000 a year for seven years to be devoted to encouraging research in the physical sciences has been made by the Pressed Steel Company, of Cowley, Oxford, to Oxford University.

It is suggested that a number of research fellowships should be established in organic, inorganic and physical chemistry, chemical crystallography, physics, colloid science, engineering, metallurgy.

American Chemical Notebook

From Our New York Correspondent

THE Office of Alien Property of the U.S. Department of Justice is offering without royalty fee to American industries two important acetate patents, and 16 United States patents covering inventions useful in the manufacture of styrene and other artificial material, all of which were formerly under the German control of I. G. Farbenindustrie or its affiliates. The acetate patents related to processes for producing acetic anhydride, required in the production of a wide range of products from explosives to rayon. The patents were seized by the Attorney General during the war. The Department of Justice also disclosed that Shawinigan Chemicals, Ltd., of Canada, owns an improvement patent on the basic acetate patents and that arrangements have been made with Shawinigan to licence its improvement "on a reasonable royalty basis" to those obtaining the basic patents.

* * *

A new type of oil tank capable of withstanding a flame temperature of up to 2000° F. has been developed for the United States Navy by the B. F. Goodrich Company, Akron, Ohio, which last week offered a demonstration of the new tank. The container, the first of its kind, is also bullet-sealing for naval aviation uses. An outer coating, in which synthetic rubber is combined with other materials is the principal source of the flame resistance and sealing capacity.

* * *

Employing the British "chromalloying" process, which diffuses chrome through the surfaces of a variety of steel or iron parts, imparting high heat-corrosion, and wear-resistance, the first pilot plant in the U.S.A. to use the process has been opened by the Diffusion Alloys Corporation, New York City. Orders for "chromalloying" the surfaces of a great numer of sample parts for large electrical, aircraft and motor manufacturers are said already to have been received for immediate production. Commenting on first tests made in the new plant, Mr. Alexander Berger, executive vice president of the company, said that improvement of up to 200 per cent before repolishing had been achieved in the operating life of die-casting dies. Tests indicated that the same dies, chromalloyed, ran 24 hours (instead of six) without repolishing, in a typical application here. The development can produce similar economies in uses of moulds for plastics, rubber or glass products, he added. The principle has important uses in chemical plant manufacture.

* * *

Discovery by U.S. Government scientists of an improved process for spinning fibre from casein, a protein of milk, has led to the commercial production by the Rubberset Company, Newark, New Jersey, of "curled casein filament" now used in a new type air filter for automobiles. The milk-protein product is a result of work by the U.S. Department's Bureau of Agricultural and Industrial Chemistry at its Eastern Regional research laboratory in Philadelphia, Pa. The process for making casein fibre, first used to produce experimental bristles for various kinds of brushes, has recently been adapted by a leading manufacturer of painter's tools for production of the curled filament used in the new filters. It is expected other industrial uses will soon be found for this material, which because of its unusual resiliency, is said to be particularly suitable for mattresses and upholstered furniture. It is being used successfully, mixed with 20 per cent of wool, in motor carburettor filters.

* * *

Development of two new metallic colours in Lustrex polystyrene, closely simulating bronze and aluminium and combining low cost with improved mouldability, has just been announced by the Monsanto Chemical Company, Springfield, Mass. The colours will be available at an 11½ cent saving over previous metallics. Lustrex in metallic colours is scheduled at 32½ cents a lb. in carload lots. Brittleness and the high cost of manufacturing—the two chief obstacles in previous attempts to approximate these new colours—have been eliminated.

* * *

The problem of control of the two physical properties of fine tungsten powders—precise and predictable particle size and distribution—are reported to have been overcome by the tungsten and chemical division of Sylvania Electric Products Inc., Towanda, Pa., and commercial production of such powders made available for requirements of tungsten carbide toolmakers. Formerly, control of these properties was not practicable for commercial production, as the process involved expensive laboratory research.

A CHEMIST'S BOOKSHELF

Quantitative Analysis. W. C. Pierce and E. L. Haenisch. Third edition. New York: John Wiley & Sons, Inc.; London: Chapman & Hall, Ltd. 1948 Pp. xiv + 520. 22s. 6d.

The present book represents a complete revision of former editions, with the addition of a large amount of new material introducing the results of recent research. The four parts of the book deal with fundamentals, volumetric analysis, gravimetric analysis, and special methods. Conceived primarily as a textbook for students, its main objectives still are to afford a clear and comprehensive presentation of the subject, but this does not deprive it of practical value to technical and commercial laboratories. Each of the chapters presents questions and problems, which are adequately answered with numerous bibliographical references to original papers and to books to be recommended for special study. Appendices containing mathematical operations, equilibrium constants, preparation of indicator solutions, logarithms and tables of international atomic weights and frequently used molecular weights will be of great use. The book presents, moreover, 80 laboratory exercises, 40 tables, 36 line drawings and its final chapter describes analysis by electrode-position, electrometric titrations and the use of analytical literature and of standard samples. It will serve well as a guide for ready location of desired analytical methods.

Pharmaceutical Technology (Pharmazeutische Technologie). Dr. H. Czetsch-Lindenwald. Vienna: Springer-Verlag, 1948. Pp. VII + 222; 23s. 6d.

This text-book deals with the industrial production of pharmaceuticals and with galenic pharmacy, which in recent years has acquired rapidly increasing importance and interest. The tendency called for the establishment of university endowments for galenics in Austria, France, Germany and the United States. During the last two decades many text-books on galenics were published and the author presents a short summary of them in a condensed form augmented by his own well-known work at the University of Freiburg. The book covers in 20 chapters the general principles and vegetable preparations as distinguished from chemical remedies. Ten further chapters deal with the pharmaceutical industries, and touch on fine chemical industry, pharmacology, colloid chemistry and other border spheres. A welcome feature of the book is the insertion of 95 schematic illustrations, more instructive than photographs. This book should have a special interest here in the light of current attempts to foster native resources of vegetable drugs, now mainly imported from foreign countries.

The Treatment and Rectification of Gases. (Die Behandlung und Reindarstellung von Gasen). Dr. Alfons Klemenc. Second edition. Vienna: Springer Verlag, 1948. Pp. x + 260. Fr. 34, $7.80.

The first edition of this book appeared in 1937 and was soon out of print. In his preface the author describes the difficulties to bring out this new publication which had to be transferred from Leipzig to Vienna. It has, however, now been possible to include the foreign literature of recent years in this much enlarged and revised edition which thus becomes the most comprehensive text (in German) on working with gases. The first part of the book is concerned with general methods in the production, fractional distillation and purification of gases. Besides a comprehensive description of the customary apparatus, the theoretical fundamentals are considered as being essential to elucidate the characteristics of those processes, and of gas analysis. The second part deals with special methods for preparation and purification, whereby inconstant and very rare gases are omitted and those which, when liquified, endure a vast (monotrop) polymerisation, a pure isolation of which has hitherto not yet been attained. Yet the book deals in detail with more than 80 different gases, giving bibliographical references to each and illustrating the text with 104 figures. A name and subject index is of particular value in the use of it.

CONTINUED CANADIAN EXPANSION

Widening Chemical and Mineral Activity

From Our Own Correspondent

CHLORINE and caustic soda have been added to the output of Sarnia's "Chemical Valley" by the latest addition to Dow Chemical of Canada's development there. The new plant will probably reach full output by May. Dow Chemical plants in Sarnia already represent an investment of $17 million and are part of a proposed $40 million development. Four new plants to cost $5 million are to begin this year. Virtually all the new plant's chlorine output will be utilised in Sarnia in the manufacture of other products, including anti-freeze and solvents. The bulk of the caustic output will be placed on sale throughout the Dominion for use in soap and paper production. Raw material for the chlorine-caustic plant will be the extensive salt deposits underlying the area. Salt brine will be processed by electrolytic methods to produce chlorine and caustic soda.

Major items of the 1949 project will be a new ethylene production plant to provide further feed stock for Ethylene Glycol anti-freeze. An addition will also be made to the Glycol plant itself to increase present output by several million gallons per annum.

Present Dow units at Sarnia include the Ethylene-Glycol plant, and a Styrom plastic moulding power plant, the latter being scheduled to start production by early February.

* * *

The possibility that Sorel, a port on the St. Lawrence, may one day be the centre of the world's largest titanium industry—based on the extensive deposits of titanium in this province—is foreseen by R. S. Stewart, assistant chief of physical metallurgy of the titanium alloy division of National Lead Company, Niagara Falls, N.Y. Addressing the monthly meeting of the Montreal chapter of the American Society for Metals, Mr. Stewart said the great ore deposits located on the north shore of the St. Lawrence River near the gulf could be shipped to Sorel by barge for processing. A vast smelter would have to be built at Sorel to handle the ore. "Titanium has been known for 160 years, but its metallurgy is in its infancy," he said. Until quite recently titanium's chief use had been as a paint pigment; one of the chief advantages which it had over other metals was that it did not corrode in salt water.

Mining of phosphate rock, one of the important raw materials required for agriculture, is again to be attempted in Canada, several of the former producing mines in the Buckingham area of Quebec having been taken under option by Montreal capital.

Phosphate mining was a big industry in Canada until 1892, when production in quantity ceased as a result of competition from cheaply mined rock phosphates of Florida and Tennessee. At the present time Canada consumes some 300,000 tons of phosphate rock yearly, all of which is imported from the United States.

Mining of phosphate rock in the Buckingham area in previous years was carried out by relatively primitive methods, mostly from open pits. In the High Rock mine, some ore was mined underground, but the vertical extent was not great. Nearly pure apatite only was shipped in these early stages of operation, and a considerable tonnage of low grade, apatite-bearing rock accumulated on the dumps, or was left in place around the margins of the lenses of pure apatite.

Since 1892 small quantities have been shipped sporadically, mostly derived by cobbing the old dumps, or as a by-product of mica mining. During the last war interest in these deposits was revived because of shipping difficulties in obtaining Florida phosphate. The Quebec Department of Mines conducted a geological survey of the belt and sampled the larger dumps. These samples contained about 15 per cent apatite.

* * *

Production by factories in Canada engaged primarily in the manufacture of fertilisers was valued at $58.7 million in 1947, compared with $49.99 million in 1946. In addition—reports the Dominion Bureau of Statistics—there was produced 234,181 tons of cyanamid, ammonium sulphate, mixed fertilisers and fish fertilisers valued at over $8 million in 1947 by establishments classified under other industrial groups. Thirty-one plants were occupied chiefly in the manufacture of fertilisers in 1947 (12 in Ontario, 5 each in British Columbia and in Quebec, and 3 each in New Brunswick and Nova Scotia) and the average number of workers increased from 2805 in 1946 to 3358 in 1947. Total production of mixed fertilisers in 1947 from all industries amounted to 673,782 tons.

URANIUM IN SOUTH AUSTRALIA

Development of Mount Painter Deposits

THE possibility that uranium deposits may assist the development of South Australia is being studied in the light of the discovery of uranium deposits in the area of Mount Painter. The exploration of this field, 300 miles north of Adelaide and 60 miles east of Copley on the railway to Alice Springs, is one of the major projects engaging the attention of the Department of Mines, South Australia.

Some 150 square miles of rugged country is being examined by prospectors and geologists according to an article in *The Chemical Engineering and Mining Review*.

Sites are tested by diamond drilling and underground development. Samples are analysed at the South Australian School of Mines, while investigations into methods of extracting the uranium from various types of ore are being carried out by the Council for Scientific and Industrial Research and the Department of Mines.

Uranium minerals were discovered near Mount Painter as early as 1910, and the deposits worked intermittently for radium until 1934. Early shipments of hand-picked ore were reported to be between 2 and 5 per cent U_3O_8, and reserves in 1914 were estimated at 300 tons of 0.5 per cent U_3O_8, with 700 tons of 0.74 per cent material lying at the surface.

Total production of uranium ore in South Australia, prior to the 1939-45 war, is estimated at 136 tons vaued at £10,000, and much of this came from Mount Painter.

Costly Investigation

In 1944 the Mount Painter deposits were intensively explored by modern methods, at the request of the British Government, with the object of producing 100 tons of uranium trioxide over a period of five years. Results indicated that an output of 20 tons might be possible in one year, but it was decided early in 1945 not to proceed. It was estimated at that time that the quantity of readily available ore did not exceed 0.33 UO_3. The cost of this investigation was about £65.000.

Exploratory work was resumed by the South Australian Government in June, 1946, and has been proceeding since by means of shaft sinking, tunnelling, diamond drilling, prospecting, and geological and geophysical surveys.

The uranium-bearing deposits of Mount Painter are similar to those in Portugal and Bulgaria, where primary uranium minerals present in granite and pegmatite have given rise to secondary enrichments.

At Mount Painter, non-fluorescent metatorbenite (hydrated phosphate of copper and uranium) and some autunite (hydrated phosphate of calcium and uranium) occur in the oxidised zone, mainly in crushed granitic and pegmatitic rocks. Many of the deposits are capped by hæmatite and limonite, with which the metatorbernite is closely associated.

Both the uranium minerals and the ironstone appear to have been deposited by circulating ground water, which has leached iron and uranium from the surrounding rocks and quartz veins.

Several shafts have been sunk near the East Painter camp, but it has generally been found cheaper and more convenient to drive adits into the hill side.

Development Needed

Apart from the immediate area near this camp, prospectors have located many occurrences which require detailed geological examination, and a considerable district still remains to be penetrated. This is being carried out at widely spaced points, and at present a detailed examination of the old Yudnamutana copper mines is in progress to determine whether there are likely to be any significant amounts of uranium associated with the copper mineralisation in these mines.

Samples of all types of material thought likely to contain uranium, either from the systematic sampling of underground workings, from bore-holes, from geologists, or from prospectors, are tested in the first instance by Geiger-Muller counters, which measure the radio-activity of any fissionable material nearby. Portable counters are carried by geologists and prospectors in the search for new deposits, while laboratory types are used by the operating staff at Mount Painter to obtain some idea of the uranium content of drill cores and of material being mined in underground workings. Mine samples and drill cores are sent to Adelaide, where the radioactivity is measured more accurately and where the uranium content is determined by chemical analysis at the South Australian School of Mines.

At present, more laboratory work is needed to guide exploratory work in the field. However, this should be provided shortly, with the appointment of additional staff by the CSIR for mineral investigational work at the South Australian School of Mines and the procurement of additional equipment and staff for the analytical laboratories.

SPANISH CHEMICAL ECONOMY

Causes of Limited and Costly Production

THE increasing importance attached in Spain to chemical developments was reflected by the recent speech by Sen. D. C. Abollado y Aribau in the Special School of Industrial Engineers, Madrid. The speech was in effect a sequel to one given in 1945 in the Institute of Civil Engineers.

Beginning with the basic materials, sulphuric and hydrochloric acids and sodium carbonate, he compared production per head in Spain with similar data for the U.S.A. (in 1947) as follows :—

	Spain kg.	U.S.A. kg.	U.S.A. multiple
Sulphuric acid	13.5	30	2.2
Sod. carbonate	2.87	18.5	6.4
Hydrochloric acid ...	0.47	1.66	3.5
Steel	—	—	14.4
Coal	—	—	8.7

It will be noted further that steel and coal production per head in the U.S.A. were respectively 14.4 and 8.7 times that of Spain, and this, of course, is an important factor in production of most chemicals, especially of sodium carbonate.

In 1948 somewhat larger allocations of coal were possible so that manufacture of sodium carbonate has increased, and the output in the U.S.A. was only 4.6 times that of Spain per head of population. Total production of sulphuric acid in 1947 was 367,000 tons.

Superphosphates

Nearly half this output of acid was used for superphosphates, and would have been more if adequate supplies of phosphorite had been obtainable.

Coal is one of the principal keys to chemical development, and here Spain is seriously handicapped. It is estimated that the monthly consumption of lignite is one million tons and of ordinary coal four million tons, with 30 per cent volatile content. Less than 500,000 tons of this is distilled at high temperature.

It is emphasised that, under present world conditions, the proper use of coal is not in the raw state, as fuel, but as an invaluable raw material for an almost infinite range of chemicals. It is recognised that only high- or low-temperature coke should be used as fuel, except possibly in the case of steam coal and other grades unsuitable for distillation.

Discussing the relative costs of production of chemical products in Spain and in the U.S.A. (*Dyna*, December, 1948), the speaker gave the following cost index figures at the 1947 level :—

	Spain	U.S.A.
Sulphuric acid, 66° Bé	0.82	0.70
Solvay soda	0.56	0.55
Caustic	1.18	1.18
Liquid chlorine	2.04	3.08
Formaldehyde 40 per cent ...	9.03	1.76
Methyl alcohol	8.15	1.54
Toluene	5	1.22
Benzene	3.60	0.90

Among the factors which added to the cost of production in Spain the lack of sufficiently high standards of chemical engineering skill in the supervisory and technical staffs engaged was admitted. Another serious difficulty was the lack of suitable materials for construction of chemical plant, such as resistant steels, porcelains, etc.

Dealing with the political and economic considerations, the speaker urged that the small firm was the best defence against Communism. The large firm, as also the State or nationalised industry, apart from the fact that there could be little close contact between employers and employed, was much more readily transformed into a Communistic regime.

Large firms were admittedly necessary for production of some basic products, such as sulphuric acid, alkalis, etc.; but it was not desirable that any branch of chemical industry should be wholly in the hands of, or dominated by, a few large firms. That problem could not be avoided by the supposedly simple recourse to nationalisation.

Much of the remainder of the speech was devoted to the needs of technical education and scientific research, together with the responsibilities of the universities.

French Tin and Copper

Mining, lately resumed at Charrier, near Vichy, is to yield tin, and copper concentrates to be used in the manufacture of copper sulphate. The ore is very complex, as is the apparatus required for its treatment, and includes a number of diverse elements to be separated by flotation. The copper mine in the Var is also to start work again. Despite considerable previous exploitation the seam is far from being exhausted.

A former mining concession in Brittany used to give 10 to 12 kg. of copper per ton of sand treated, but was abandoned because of difficulty in separating other components, which included iron and titanic acid. With electro-magnetic separation the titanic acid will now also be exploited.

Home News Items

Functions of Chemicals.—The rôle of chemical industry in the United Kingdom in war and peace is one of the main themes of the lecture series to workers in Scotland.—"Science in Industry"—which Dr. Gibson Aitken is now presenting under COI auspices.

Lost Drug Warnings.—Broadcasts concerning the loss of drugs have been discontinued by the BBC by arrangement with the Pharmaceutical Society. Exception will be made only when there may be real danger to life, or where drugs and poisons are known to have been purchased by mistake for some harmless medicine.

Paint Production Adequate? — Paint Manufacturers in Scotland are stated to be limiting expansion schemes, suggesting that current production has reached a point where further construction of new plant might be uneconomic. The construction of some new factories has been deferred, pending a fuller volume of demand.

For Ex-Servicemen.—H.R.H the Duchess of Gloucester will officially open the new British Limbless Ex-Servicemen's Association at Lytham Road, Blackpool on June 25. The association, which has assisted many thousands of limbless war veterans, is seeking public support to meet initial cost of the home, assessed at £25,000. The chairman of the appeal committee is Lord Willoughby De Eresby, 25 Charles Street, London, W.1.

Coal Output.—There was a slight fall in coal production in Britain last week compared with the preceding week, but the total tonnage was 1.9 per cent higher than in the corresponding week of 1948. Comparing figures are: Last week: 4,311,300 tons (deep-mined 4,085,900 tons, opencast 225,400 tons). Previous week: 4,334,000 tons (deep-mined 4,101,900 tons, opencast 232,100 tons). Week ended March 6, 1948: Deep-mined 3,990,700 tons, opencast 239,000 tons (total 4,229,700 tons).

Fish Growth Experiments.—The need to carry out larger experimental work to determine whether sea areas could be fertilised on the lines of the Kyle Scottish experiment was emphasised by Dr. Fabius Gross, speaking in Edinburgh. So far, he said, no evidence had been produced to show that the method could not be used. The Kyle Scottish experiment used 2½ tons of ammonium sulphate and superphosphate in an open area with slight loss of fertilisers by tidal water. The plankton improved so much that the weight increase of flat fish in the area was three to five times normal.

Opposition to Steel Bill.—Mr. Alfred Edwards, M.P. for Middlesbrough, addressed the public meeting in Liverpool last week at which a resolution was passed demanding the abandonment of the Steel Bill, "in the best interests of British prosperity both at home and abroad."

U.S. Equipment for Cambridge.—A gift "not exceeding £15,000" has been made by the Rockefeller Foundation to Cambridge University for the purchase in the U.S.A. of equipment to be used in the chemiacal laboratory under the direction of Prof. A. R. Todd, Professor of Organic Chemistry in the University.

Solvent and Anæsthetic.—Four people were found unconscious in a dry cleaners' process room in Bournemouth last week, having been overcome by an accidental escape of fumes from the solvent used in dry cleaning. Two of them were taken to Basingstoke Hospital for plastic surgical treatment, suffering from severe burns caused when they fell unconscious across steam pipes

Jubilee Meeting.—The 50th anniversary of the opening of West Ham Municipal College and Library falls during the present session and will be marked by a special meeting in the Assembly Hall of the college at 7 p.m.. on Monday, April 4. The principal speaker will be Mr. George Tomlinson, Minister of Education on the subject of "Further Education."

Atomic Scientist Killed.—Mr. Birrell Russell, a principal scientific officer of the atomic energy research establishment at Harwell, died on Tuesday as a result of head injuries received when he slipped and fell from a high platform. Mr. Russell had been working on the separation of the non-radioactive isotopes of oxygen required for medical research. He had been working on the high vertical columns in which the separation is carried out.

Keen Foreign Demand for Glass.—Increased production and extension of plant in Midlands factories to meet foreign demand are reported by a *Birmingham Post* special correspondent. Chance Bros., glass manufacturers, now represented in 70 overseas countries have orders ranging from lighthouses to an inquiry from Philadelphia for one million microscope slides. A building scheme costing £750,000 is expected to be completed in about one year. Sir Hugh Chance (chairman), said that exports now represented nearly 25 per cent of a greatly increased output, compared with 10 per cent in 1938.

Personal

THE Fine Chemicals Group of the Society of Chemical Industry has nominated the following officers, whose appointment is expected to be ratified at the annual general meeting of the society in July: Chairman, SIR JACK DRUMMOND, F.R.S.; vice-chairman, DR. F. BERGEL; hon. treasurer and secretary, DR. WM. MITCHELL; hon. recorder, DR. F. HARTLEY; committee members: DR. D. W. ADAMSON, DR. H. J. BARBER, DR. G. M. DYSON, DR. N. EVERS, DR. S. H. HARPER, DR. B. A. HEMS, PROF. D. H. HEY, DR. J. D. KENDALL, DR J. T. MARTIN, MR. J. C. MCGOWAN, MR. F. A. ROBINSON, DR. T. S. WORK.

The first conference in this country of directors of industrial research was opened at Ashorne Hill, Leamington Spa, yesterday (March 11), under the auspices of the Federation of British Industries industrial research committee It is to continue until Monday next, March 14. Chairmen and speakers at the various sessions include the following:—

SIR WALLACE AKERS (I.C.I., Ltd.), MR. F. H. SANITER (United Steel Companies, Ltd.), DR. W. D. SCOTT (Monsanto Chemicals, Ltd.), MR. J. A. ORIEL (Shell Petroleum, Ltd., and Shell Refining & Marketing Co., Ltd.), MR. A. W. MONTGOMERY (Standard Telephones & Cables, Ltd.), DR. I. J. FAULKNER (I.C.I., Ltd.), DR. P. DUNSHEATH (W. T. Henly's Telegraph Works Co., Ltd.), DR. JAMES PARK (British Oxygen, Ltd.), MR. L. J. DAVIES (British Thomson-Houston, Ltd.), SIR CHARLES GOODEVE (British Iron & Steel Research Association), MR. O. W. HUMPHREYS (General Electric Co., Ltd.), DR. C. G. WILLIAMS (Shell Petroleum Co., Ltd.), MR. R. M. WINTER (I.C.I., Ltd.), DR. L. B. Pfiel (Mond Nickel Co., Ltd.).

The resignation through ill-health is announced of PROF. LESLIE AITCHISON, Professor of Industrial Metallurgy at Birmingham University since 1946. He was a graduate of Sheffield and London Universities, a Research Fellow in metallurgy at Sheffield, and was appointed lecturer after a period of service in the steel industry. He has played a prominent part in the growth of the light alloy industry, and until recently was chairman of the Inter-Services Metallurgical Research Council.

DR. HANS NITSCHMANN, lecturer and chief assistant of the institute of organic chemistry at Berne University, has been appointed professor extraordinary. At the same time, he has been appointed consultant chemist of the central laboratory of the blood donor service of the Swiss Red Cross. Dr. Nitschmann, who is 42, received in 1944 the Haller Medal for his scientific research work.

The invitation of the chairman of the Parliamentary and Scientific Committee to serve on the sub-committee on the Spens Report on salaries of teaching and research staffs in universities, etc., has been accepted by the following: MR. F. A. COBB, M.P. (chairman); LORD STRABOLGI, PROF. E. N. DA C. ANDRADE, F.R.S. (Physical Society); PROF. H. BARCROFT (Physiological Society); DR. G. E. FOXWELL (Institute of Fuel); DR. JOHN HUMPHREY (Association of Scientific Workers); MR. NORMAN SHELDON (British Association of Chemists); a representative of the Institution of Professional Civil Servants. It has been suggested that the enquiry might be widened to consider the repercussions on: (1) Salaries of economists and other social scientists employed at the Universities; (2) specialists in the Government service: (Reference, passages in the speech made at the annual luncheon by Sir John Anderson, M.P.).

PROF. A. H. GIBSON, who has occupied the Beyer chair of engineering in Manchester University for 29 years is to retire in September. He is the author of a wide range of books and papers. His special interest since 1926 has been the use of hydraulic scale-models, which resulted in 1946 in the establishment of the Hydraulics Research Organisation of the Department of Scientific and Industrial Research.

The successor to Prof. Gibson will be PROF. W. R. HAWTHORNE, who obtained first-class honours in the Mechanical Sciences Tripos at Cambridge and joined the firm of Babcock & Wilcox Company, working on boiler research. He is known for the researches he directed on gas turbines during the war and for his interest in the combination of fluid flow and combustion—"gas dynamics." He is at present lecturer and Westinghouse professor of gas turbines at the Massachusetts Institute of Technology.

SIR CHARLES WRIGHT, Iron and Steel Controller from 1940-43, is to resign his directorship of Richard Thomas & Baldwins, Ltd., the iron and steel makers. At 73, he has had more than 55 years' association with the industry. He was previously Thomas & Baldwins' managing director.

MR. HUGH LINSTEAD, M.P. for Putney, who is secretary of the Pharmaceutical Society of Great Britain, has been elected a foreign corresponding member of the Academy of Medicine of France, the premier French medical society.

(*Continued on next page*)

PROF. R. A. PETERS, Whitley Professor of Biochemistry in the University of Oxford, will leave England on March 3 for Italy where he will lecture for the British Council in Milan, Pavia, Padua, Bologna, Rome and Naples to biochemists and medical graduates on "Biochemical Lesions and their Meaning" and on "Biochemical lesions in arsenical poisoning and British Anti-Lewisite."

DR. FRANCIS HENRY SWINDON CURD, of Bramhall, Cheshire, leader of the team who developed the drugs Paludrine and Antrycide, who was killed in a train accident on December 3 last, left £918.

OBITUARY

THE death has occurred, at his home at Pangbourne, near Reading, of MR. CHARLES E. HODGKIN, chairman of the Pulsometer Engineering Co., Ltd., Nine Elms Iron Works, Reading. Mr. Hodgkin, who was in his 89th year, was the fourth son of the late Mr. John Eliot Hodgkin, founder of the company. He started his career at the family works in Battersea, which he left to go as chief draughtsman to the Brush Electrical Engineering Co., Ltd., at Lambeth, later becoming its works manager at Loughborough. In 1900 he returned to the Pulsometer Engineering Works at Reading to take control of production. A few years later he became joint managing director of the company with his brother, the late Mr. S. H. Hodgkin, and on the latter's death, in 1944, he became chairman of the board, remaining in office until his retirement on December 31, 1948. For a long period he edited the company's works magazine "The Bulletin," also the firm's more technical publication, "The Triangle."

The death has occurred in Nelson, New Zealand, of SIR THOMS HILL EASTERFIELD, K.B.E., who, from 1894-98 was a lecturer at Cambridge, and in 1899 was appointed professor of chemistry in Victoria University College, Wellington, New Zealand, a post which he held until 1919. He was until 1933 the first director of the Cawthorn Institute, Nelson, and during the 1914-18 war was a member of the New Zealand Munitions Board. He played a prominent part in scientific organisation and was president of the Wellington Philosophical Society 1903-04, the chemical section of the Australian Association for the Advancement of Science, 1909, and the New Zealand Institute (now the Royal Society), 1920-21.

The death has occurred of MR. JOHN JOSEPH MURPHY, a director of Gypsum Industries, Ltd., Kingscourt, Co. Cavan.

Destructive Sulphur

U.K. Contributions to U.S. Oil Talks

BRITISH chemists from the Anglo-Iranian Oil Co., Ltd., will make important contributions to the discussions of sour crude oil, the corrosive raw material which has become one of the petroleum industry's most serious problems, which will be the subject of exhaustive study at a two-day symposium to be held in connection with the 115th national meeting of the American Chemical Society in San Francisco, from March 28 to April 1.

The costly effects of sour crude oil, which derives its undesirable properties from its high content of sulphur compounds, and the best methods of combating these effects will be discussed in a total of 29 technical papers.

Concern over the sour crude oil problem has grown with the enormous increase in petroleum consumption in the United States. Formerly, oil reserves so far exceeded demand that the industry was able to meet its needs with selected petroleum of low sulphur content. For this reason, relatively little attention was given to the chemistry of high-sulphur petroleum.

Although it is known that the sulphur in crude oil corrodes pipe lines, storage tanks, and refinery equipment, and that any sulphur retained in gasoline and lubricating oils contributes to engine wear and damaging deposits, the exact effects of specific proportions of sulphur have yet to be determined. Recognised specifications for permissible amounts of sulphur in gasoline and oil have been based largely on rule-of thumb estimates.

Chemists are now endeavouring to find how large a sulphur content can safely be permitted, how the effects of various sulphur compounds differ, and how their removal or control can best be achieved. The possible development of a valuable new sideline for the petroleum industry, through the recovery of sulphur compounds is also under investigation.

The four British chemists taking part in the symposium are D. Haresape, F. A. Fidler and R. A. Lowry, of the Anglo-Iranian research station at Sunbury-on-Thames, Middlesex, who will report on "The Separation of Sulphur Compounds by Adsorption on Silica Gel," and Mr. R. L. Denyer who, with Lowry and Fidler, will describe "Azeotrope Formation Between Thiols and Hydrocarbons."

New Address.—The new address of the London office of Brookhirst Switchgear, Ltd., is Alliance House, 12, Caxton Street, London, S.W.1. (Telephone, Whitehall 9904).

Overseas News Items

Engineers Needed.—The Minister of Labour for Canada, Mr. Humphrey Mitchell, states that there is a particular shortage of civil, mechanical and chemical engineers in that country.

South African Coal Output.—According to provisional figures calculated by the South African Department of Mines, the Union's coal output last year reached approximately 26,474,500 tons.

German Chemicals for Finland.—Chemicals, iron and steel products and textiles are among the goods to be shipped by the three western zones of Germany to Finland under a new trade agreement. Pulp, cellulose and newsprint are to be sent in return. Total joint value is to be $20 million.

Swiss Pharmaceuticals for Egypt.—The Egyptian Ministry of Finance has given its assent to barter transaction under which the Swiss Firm of Hoffmann—La Roche, Basle, is to supply pharmaceutical products valued at 1.5 million Swiss francs in exchange for cotton.

British Exhibits at Poznan.—The Federation of British Industries announces that among the United Kingdom firms which are to exhibit at the Poznan Fair, from April 26 to May 10, are the following: De La Rue Insulation, Ltd., Cookson Produce & Chemical Co., Ltd., and R. & J. Dick, Ltd.

Exploiting Colombian Oil.—The Congress in Colombia has authorised the creation of an Industrial School of Petroleum at Barranca Bermeja and the purchase of equipment for a national oil refinery to be operated by a Colombian company to which a limited amount of foreign capital may be subscribed. The production of petroleum in Colombia during 1948 was 23.6 million barrels.

Dutch Chemicals for Poland.—A recently concluded trade agreement between Holland and Poland, envisaging an exchange of goods either way to the value of about 57 million guilders, provides for the shipment by Holland of basic chemicals and intermediates for the chemical pharmceutical industries (value 400,000 guilders), various chemical products (1 million), pharmaceutical products and specialities (250,000), gelatine for photographic materials (50,000), alkaloids, etc., (150,000). In return, Poland has agreed to ship coal, steel plate and metal goods, various chemicals, including accelerators for the rubber industry (1 million guilders), pure zinc, powdered zinc, zinc white, and glass.

Swiss Lead Deposits.—A Swiss industrialist is reported to be making a new attempt at exploiting the lead occurrences near Goppenstein, located at a height of 1900 metres.

Swedish Herring Oil Project.—The board of the Swedish West Coast Fishermen's Association has decided to purchase land in the Gothenburg archipelago for the construction of a herring oil factory.

South African Standards Bureau.—A Durban firm of industrial chemists is one of the first three concerns in South Africa to be granted permission to use the guarantee mark of the S.A. Bureau of Standards. Another is a Johannesburg firm producing refined oils.

Steel Decline Perturbs Australia.—The Australian Government has ordered a review of the steel industry. Steel ingot output last year was 11 million tons—2 million tons less than in 1946-47 and 1 millllion tons less than in 1939-40. The decline is attributed to coal shortage.

Canada's Steel Output.—Canada's steel production for 1948 exceeded for the first time the three million tons mark. A total of 3,089,027 tons is reported, against 2,854,532 in 1947. The previous record was established in 1942 with 2,958,906 tons. The daily average rose from 7821 tons in 1947 to 8440 last year.

New Salt Deposits in Sweden.—New salt deposits have been found near Trelleborg, in Scania, the Swedish Board of Trade reports. Two wells about 1200 metres deep are each expected to produce about 100 cu. metres of salt water an hour. Yearly production is estimated at 108,000 tons of salt. Sweden's present salt consumption is about 300,000 tons yearly.

South African Manganese.—While manganese exports from South Africa have in the past been restricted by the lack of labour and rolling stock, an increase is anticipated as soon as the railways have received new rolling stock from overseas, as well as from local factories. The Canadian Car and Foundry Co., Ltd., has been given a special allocation of U.S. steel for the manufacture of ore-carrying trucks for South Africa. According to Department of Mines figures, South African manganese exports totalled last year 356,400 tons, valued at £862,300, compared with 372,486 tons in 1947, valued at £831,176. A large proportion of the shipments went to the U.S.A.

Next Week's Events

MONDAY, MARCH 14

The Chemical Society. Eire: Dublin, University College, 7.45 p.m. Joint meeting with University College of Dublin Chemical Society and the Werner Society. Prof. T. S. Wheeler "Development of the Periodic Table."

Institute of Metals. (Scottish Local Section). Glasgow: Institution of Engineers and Shipbuilders in Scotland, 6.30 p.m. G. Skript. "Some Thoughts on Organisation, Economics, and Good Housekeeping in Non-Ferrous Jobbing Foundries."

Industrial Measuring Instruments Exhibition. London: Marconi Instruments, Ltd., 109, Eaton Square, S.W.1. From March 14-25 (Monday to Friday).

TUESDAY, MARCH 15

Society of Chemical Industry. (Plastics Group). London: Manson House, Portland Place, W.1., 6.30 p.m. D. L. Clarkson and N. D. MacLeod: "Polyvinyl Chloride Pastes." (Chemical Engineering Group) London: Burlington House, W.1, 5.30 p.m. H. G. P. Tyrer: "Outline of the History and Development of the Beet Sugar Industry in Great Britain."

The Chemical Society. Leeds: University, 5.30 p.m. Joint meeting with Leeds University Chemical Society. Scientific film display. Prof. E. L. Hirst: "Structural Relationships among the Polysaccharides."

Hull Chemical and Engineering Society. Hull: Church Institute, Albion Street, 7.30 p.m. Joint meeting with British Leather Manufacturers Research Association. Dr. F. E. Humphreys: "Tanning as a Chemical Engineering Problem."

WEDNESDAY, MARCH 16

Royal Institute of Chemistry. London: Royal Institution, Albemarle Street, W.1. Joint meeting with London Branch, Institute of Physics. Prof. F. J. M. Stratton and F. Hoyle: "The Chemistry and Physics of Hot Stars."

Institute of Welding. (North London Branch). Walthamstow: South West Essex Technical College, 7.30 p.m. C. A. Burton: "Developments in the Technique of Resistance Welding."

Institution of the Rubber Industry. Leicester: College of Technology, 7 p.m. Lecture: "Science in Industry."

Royal Society of Arts. London: John Adam Street, Adelphi, W.C.2, 2.30 p.m. Cadman Memorial Lecture. Sir Charles and William Reid: "Reconstruction of the British Mining Industry."

Royal Statistical Society. (Industrial Applications Section). Newcastle-on-Tyne: Chemical Industries Club, 18, Louvain Place, 6.30 p.m. W. J. Jernett: "The Integration of Elementary and More Advanced Statistical Methods in the Control of Processes."

THURSDAY, MARCH 17

The Chemical Society. London: Burlington House, W.1., 7.0 p.m. Discussion, "Aspects of Heterogenous Catalysis" arranged by Dr. R. Holroyd. D. A. Dowden: "Theoretical Basis"; Dr. P. W. Reynolds: "Hydrogenation by Binary Alloys." Edinburgh: North British Station Hotel, 7.30 p.m. Joint meeting with local sections of the RIC and SCI. Dr. F. N. Woodward: "Recent Trends in the Industrial Utilisation of Agricultural Products in North America."

The Royal Society. London: Burlington House, S.W.1. 4.15 p.m. Election of Fellows. 4.30 p.m. W. E. Garner, T. J. Gray, and F. S. Stone: "The Oxidation of Copper and the Reactions of Hydrogen and Carbon Monoxides with Copper Oxide"; T. J. Gray and W. E. Garner: "The Application of Semi-conductivity Measurements in the Study of Heterogeneous Catalysis"; E. H. M. Badger, R. E. Griffith, J. D. F. March and W. B. S. Newling: "The Catalytic Demonstration of Simple Heterocyclic Compounds."

Oil and Colour Chemists' Association. London: 26 Portland Place, W.1, 7.0 p.m. A. Webster: "Factory Hazards."

FRIDAY, MARCH 18

The Chemical Society. Birmingham: University, Edgbaston, 4.30 p.m. Joint meeting with Birmingham University Chemical Society. Dr. F. G. Mann: "Some Aspects of Stereochemistry."

Society of Chemical Industry. Birmingham: University, Edgbaston, 6.30 p.m. Jubilee Memorial Lecture, H. V. Potter: "Synthetic Fibres."

Plastics Institute. Manchester: J. B. Haughton: "Thermosetting Moulding as Viewed by a Practical Moulder."

The Royal Institution. London: 21, Albemarle Street, W.1, 9.0 p.m. Kathleen Lonsdale: "Neutron Diffraction by Crystals."

SATURDAY, MARCH 19

The Bradford Chemical Society. Bradford: Technical College. Symposium: "Physical Methods in Chemical Analysis."

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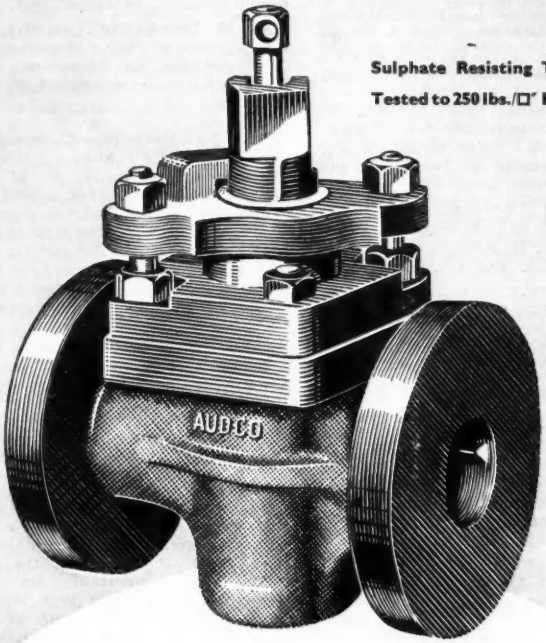

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Commercial Intelligence

The following are taken from the printed reports, but we cannot be responsibe for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described herein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

EMMET LABORATORIES, LTD., London, W. (M., 12/3/49.) January 24, mortgage, to Barclays Bank, Ltd., securing all moneys due or to become due to the Bank; charged on 53 Hildaville Drive, Westcliff-on-Sea.

IBEX PETROLEUM PRODUCTS, LTD., London, W. (M., 12/3/49.) February 1, £1500 debenture, to D. M. B. Fitzgerald, London; general charge. *Nil. December 9, 1947.

QUICKFIT & QUARTZ, LTD., London, W. (M., 12/3/49.) January 26, £45,000 charge to Lancegaye Safety Glass (1934) Ltd.; charged on freehold factory, premises at Stone (Staffs.). *Nil. October 20, 1948.

Satisfactions

ATOMISED FOOD PRODUCTS, LTD., Welwyn Garden City. (M.S., 12/3/49.) Satisfaction January 28, of mortgage registered September 8, 1945

BLACKWELL'S METALLURGICAL WORKS, LTD., Liverpool. (M.S., 12/3/49.) Satisfaction February 5, of debentures registered January 9, 1929.

COPPER & ALLOYS LTD., West Bromwich. (M.S., 12/3/49.) Satisfaction January 31, that part of the property comprised in mortgaged registered Deecember 17, 1947 (two small strips of land off Greets Green Road, near to Bull Lane, West Bromwich) has been released from the charge.

KINGSCLIFFE SUPER-REFRACTORIES, LTD., Sheffield. (M.S., 12/3/49.) Satisfaction January 25, of debenture registered March 6, 1942.

RUBBERINE, LTD. (formerly RUBBERINE-SYNLAC, LTD.), London, N. (M.S., 12/3/49.) Satisfaction January 22, of charge registered February 2, 1937.

New Companies Registered

Aluplast (Merton), Ltd. (464,953). Private company. Capital £100. Manufacturers of organic and inorganic chemical substances, synthetic plastics and plastic substances, or all phenolic condensation products, etc. Directors: F. W. Piddock, R. H. Corfield Reg. office: Trafalgar Works, Station Road, Merton Abbey, S.W.19.

Vincent Davis Glazes, Ltd. (465,314). Private company. Capital £2000. Manufacturers of potters' glazes, colours and chemicals, etc. Directors: J. Tellwright, W. A. Tellwright, C. V. Davis. Reg. office: London Road, Stoke-on-Trent.

C. W. Dennis, Ltd. (464,961). Private company. Capital £100. Manufacturers of plastic substances, etc. Solicitors: Aukin Courts & Co., 5 Queen Anne Street, W.1.

Plastics Development.—Speaking at the company's third annual sales conference, at Bolton recently, Mr. H. L. Hill, general manager of the United Ebonite & Lorival Company, said the firm was going ahead with its original development programme, which would cost over £250,000. The factory enlargement would give the company a much larger output in the future, both of moulded plastics and ebonite and PVC sheeting.

Chemical and Allied Stocks and Shares

STOCK markets have again been depressed and reactionary, international political developments being an additional factor making for caution. Indications of growing competition, both at home and overseas, were again an influence, and the City remains doubtful if the Budget will bring any important tax concessions. Although not holding best levels, firmness of British Funds has again contrasted with the big fall of values in industrial and other shares.

Shares of chemical and kindred companies were again unable to move against the prevailing market trend. Imperial Chemical, which were recently a steady feature, have reacted to 45s. 6d. at the time of writing, although maintenance of the 10 per cent dividend continues to be confidently expected. Fisons have come back to 59s., and Monsanto reacted further to 55s. 7½d.

Yield on the latter is still below 4 per cent on the basis of last year's 45 per cent dividend on these 5s. shares. This is, however, a case where there seem prospects of a higher dividend rate when Sir Stafford Cripps' dividend limitation request is lifted eventually.

Burt Boulton remained at 28s. 9d., but British Glues & Chemicals 4s. ordinary

shares came back to 20s. and now yield rather more than 4⅞ per cent.

British Xylonite reacted further to £5, De La Rue were lower at 36s. 6d., British Industrial Plastics 2s. shares fell sharply to 5s. 3d., while Borax Consolidated at 53s. 1½d. and the 4s. units of the Distillers Co. at 27s. again moved against holders. Turner & Newall at 79s., British Oxygen at £5 and United Molasses at 44s. 3d. also followed the general trend. Nevertheless, selling has not been heavy. The lower prices have been brought about by absence of demand, which has given relatively moderate selling a disproportionate influence on markets.

Lever & Unilever have fallen back to 45s. and Lever N.V. to 42s. 6d., while Dunlop Rubber were down to 70s. 6d. News that the match industry is included in the Government's "Monopolies probe" reacted sharply on British Match shares, which receded to 33s.

Elsewhere, Babcock & Wilcox declined sharply to 71s., Guest Keen eased to 48s., and Allied Iron came back to 66s. 3d. Although electrical equipment is included in the monopolies probe, falls in this section were relatively moderate.

Boots Drug at 52s. moved down with the general trend, as did Beechams deferred at 15s. 9d., Sangers at 34s. and Griffiths Hughes at 28s. Falls in the bulding and kindred groups were mostly moderate. General Refractories 10s. shares were 23s. 1½d., Metal Box slightly over £5, and Triplex Glass, after their steady showing, eased to 22s. 9d. Oils failed to hold an earlier small rally. Anglo-Iranian receded to slightly below £8, Shell were 66s. 10½d., Trinidad Leaseholds 26s. 6d. and Ultramar Oil, after touching 31s. 3d., came down to 28s. 9d.

British Chemical Prices

Market Reports

FIRM price conditions characterise almost all sections of the general chemicals market, there being a sustained demand both for home and export account. Contract deliveries to the leading consuming industries are proceeding satisfactorily and traders report a fair volume of new bookings. An active inquiry has been maintained for bichromate of soda, caustic soda and chlorate of soda, the last named item being in particularly strong request. The potash products are all well held on an active demand with permanganate of potash a brisk market. Acetic, oxalic, citric and tartaric acids continue in strong request, while a steady trade is passing in acetone and formaldehyde. There is a steady market for the non-ferrous metal products, the only price change being a reduction of 30s. per ton in the price of ground white lead. The market in coal tar products is steady with no change to record.

MANCHESTER.—Traders on the Manchester chemical market during the past week have experienced little indication of any setback in the demand for the alkalis and other leading heavy products. There is sustained pressure for supplies of soda ash from the glass, textile and other using industries, and the other soda compounds are also meeting with a steady inquiry on home consumption account as well as for export. A ready outlet is being found for caustic potash and other potash chemicals, and a steady demand has been reported for the principal ammonia and magnesium compounds. Among the fertiliser materials, there is growing interest in sulphate of ammonia, superphosphates and the compounds. In tar products, there is a steady call for supplies of pitch and crude tar, and creosote oil is meeting with a good demand.

GLASGOW.—Conditions in the Scottish chemical market have shown some improvement during the past week. The demand for Glauber salts, anhydrous sodium sulphate, and trisodium phosphate has been high, but supplies have been sufficient. There has also been a higher demand for disodium phosphate, stocks of which are not so readily available. The solvent demand has been well maintained, the main shortage being methylene chloride, of which considerably greater quantities than are available are required. The export market has once again had a very satisfactory week.

NEW INSTRUMENT FACTORY

Everett, Edgcumbe & Co., Ltd., of Hendon, London, N.W.9, has opened a branch factory at Houghton-le-Spring, Co. Durham. This will be concerned in its initial stages with Synlock productions such as miniature synchronous motors, process timing devices, synchronous clocks and chart drives for roll chart and disc chart graphic instruments. The factory will be fully equipped with machine tools, process equipment and test facilities so that it can develop into a complete manufacturing unit and, later, deal with other products.

The new factory will be under the management of Mr. C. Leney, who was previously in charge of the instrument shop at Colindale. Hendon, which will remain the administrative headquarters.

Patent Processes in Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of specifications accepted will be obtainable, as soon as printing arrangements permit, from the Patent Office, Southampton Buildings, London, W.C.2 at 2s. each. Higher priced photostat copies are generally available.

Complete Specifications Accepted

Manufacturing, in a mould, of polymerised products.—Chemische Fabrik Schonenwerd H. Erzinger Akt.-Ges. Jan. 24, 1945. 615,223.

Plasticised resins.—Bakelite, Ltd. Jan. 30, 1945. 615,332.

Devices for injection of fertilisers into the ground.—B. R. Glaenzer. July 21, 1945. 615,227.

Production of synthetic rubber.—Phillips Petroleum Co. Feb. 2, 1945. 615,229.

Method and apparatus for recovering ammonia from ammonia-containing gases—Koppers Co., Inc. October 4, 1945. 615,641.

Process for the preparation of meso-amino-acridines from diphenylamine-2-carboxylic acids.—Sterling Drug. Inc. March 3, 1945. 615,455.

Production of phenolic resins.—Bakelite, Ltd. Feb. 27, 1945. 615,335.

Process of producing birefringent material.—International Polaroid Corporation. March 3, 1945. (Cognate Applications 6091/46 and 6092/46.) 615,456.

Purification and reactivation of contaminated solid catalytic material—J. C. Arnold (Standard Oil Development Co.). March 5, 1946. 615,647.

Pesticidal and pest-repellent compositions.—E. Kolb and L. Gindraux. June 2, 1943. 615,458.

Glyceride oils.—Pittsburgh Plate Glass Co. Sept. 7, 1945. 615,239.

Phenolic-alkyd resins.—Norton Grinding Wheel Co., Ltd. April 26, 1945. 615,240.

Resin compositions and adhesives.—Firestone Tyre & Rubber Co. March 31, 1945. (Cognate Application 9296/46). 615,241.

Manufacture of semi-esters of unsaturated dicarboxylic acids.—Ciba, Ltd. April 9, 1945. 615,665.

Oil filters.—Houdaille-Hershey Corporation. April 12, 1945. 615,250.

Reclaiming of waste wax paper.—National Oil Products Co. May 10, 1945. 615,254.

Production of regenerated cellulose materials.—British Celanese, Ltd. May 1, 1945. 615,342.

Mechanism for conveying sheet, filamentous and like materials.—Timsons, Ltd., and E. A. Timson. May 8, 1946. 615,672.

Polyvinyl chloride compositions, their manufacture and application.—Imperial Chemical Industries, Ltd., A Duerden and C. P. Herd. June 10, 1946. 615,256.

Alkilation of aromatic hydrocarbons.—Compagnie Francaise de Raffinage. Nov. 17, 1942. 615,566.

Soda lime gas absorbents.—Dewey & Almy Chemical Co. May 18, 1945. 615,345, 615,346.

Production of mixed fertilisers.—Imperial Chemical Industries, Ltd., J. W. R. Rayner, J. H. Hudson and G. D. Thomas. April 14, 1947. (Cognate Application 9875/47). 615,476.

Air conditioning apparatus.—Birlec, Ltd. and J. Harris. May 18, 1946. 615,567.

Method of conducting catalytic conversions.—Shell Development Co. June 21, 1945. 615,479.

Means for the measurement of surface curvature in at least one dimension.—H. Boardman, A. Whitehead and S. R. Burrow. May 31, 1946. 615,570.

Production of zinc.—National Smelting Co., Ltd., and S. Robson. June 5, 1946. 615,349.

Production of unsaturated alcohols.—Shell Development Co. Nov. 13, 1945.

Stabilisation of tannic acid precipitated hemolytic streptococcus toxins.—Lederle Laboratories, Inc. June 20, 1945. 615,351.

Method of producing industrially important aluminium-silicon alloys.—Spolik Pro Chemickou a Hutni Vyrobu Narodni Podnik. July 8, 1940. 615,572.

Process for the treatment of hydrophilic cellulose textiles.—Comptoir des Textiles Artificiels S.A.R.L. April 21. 1944. 615.264.

Preparation of novolak resins.—Bakelite, Ltd., E. G. K. Pritchett and G. Barnett. June 18, 1946. 615,488.

Integrated mica and method of making the same.—M. D. Heyman. June 20, 1946. 615,489.

Pre-cooling and purification of gaseous mixtures prior to liquefaction.—British Oxygen Co., Ltd., and P. M. Schuftan. June 25, 1946. 615,683.

Method of manufacturing masses of metal particles.—Metals Disintegrating Co., Inc. Aug. 23, 1944. 615,580.

Process of manufacturing silica gel.—A. F. Burgess (International Minerals & Chemical Corporation). July 1, 1946. 615,581.

Method for the preparation of stable suspensions of hormones from the anterior lobe of the hypophysis in oil—Naamlooze Venootschap Organon. Nov. 1, 1940. 615,357.

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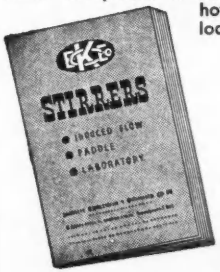

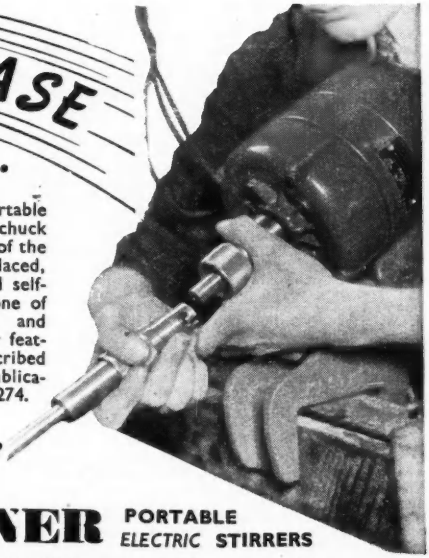

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PATENT

NOTICE IS HEREBY GIVEN that N.V. De Bataafsche Petroleum Maatschappij seeks leave to amend the complete specification of the Letters Patent No. 611919 for an invention entitled "A process for the manufacture of valuable reaction products of high-molecular unsaturated substances containing more than one unsaturated grouping in the molecule with inorganic acids or acid anhydrides."

Particulars of the proposed amendment were set forth in the Official Journal (Patents), No. 3134, dated March 9th 1949.

Any person may give notice of Opposition to the amendment by leaving Patents Form No. 19 at the **Patent Office, 25, Southampton Buildings, London, W.C.2,** on or before the 11th April, 1949. **J. L. BLAKE, Comptroller-General.**

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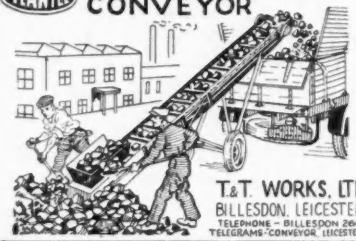

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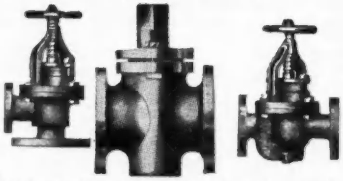

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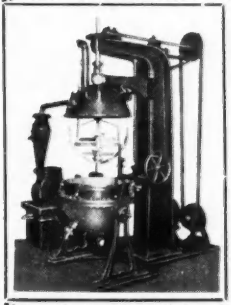

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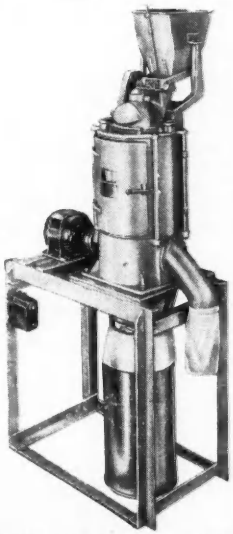

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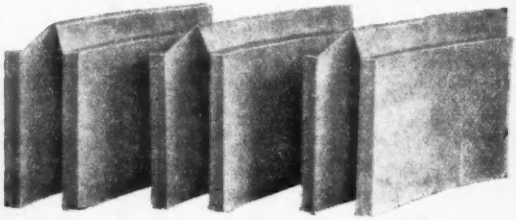

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